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WORK ON BREEDING TROUBLES OF DAIRY CATTLE AT CORNELL UNIVERSITY

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I am afraid that I cannot tell you what you all want to know: how to treat sterility with a high degree of success. I hope to hear some of the answers to our problems on this side of the Atlantic. Our viewpoint in the United States has become a very cautious one in this respect. An early piece of work at Cornell (Asdell, *et al.*, 1941), in which we attempted to treat shy breeders with oestrogens, showed us that the rate of spontaneous recovery in such cases might be high, amounting in this instance to 50 per cent. within a year. Our experience has since been supported by Frank (1950) whose work was on a much larger scale. Neither of us found that hormone therapy was of much use on a mass basis. Instead, we have been attempting to evaluate the problems as we encounter them in the field and to give the proper emphasis to each in our thoughts and planning. This is to give full weight to the fact that poor breeding is not one problem but many, not susceptible to a single panacea.

As an aid to this work we have set up a mobile laboratory with which we can visit problem herds and examine them minutely. The laboratory was given to us by farmers' organisations who believed in the approach we were making in attempting to solve a most troublesome situation. One thing we soon found was that many dairymen had but the haziest idea of what constituted a problem herd and when they had real trouble on their hands. So we had to set up average values for comparison. We find that the average number of services per conception for cows that do conceive is about 1.85, and that one can expect about 10 per cent. of all cows to be troublesome at any one time.

Some of the herds that we have visited have been excellent breeding herds by these criteria. The owner did not know this because he did not have regular pregnancy checks and he did not know, in consequence, how his herd was performing. This is pointed up by the knowledge we have that up to 60 per cent. of cows slaughtered for breeding difficulties are in calf. This is a problem in education and I believe that we have a good deal to do in this direction to lessen the incidence of so-called sterility.

MANAGEMENT AND DISEASE.

Our mobile laboratory experience has caused us to divide the problem into two major aspects, that of management and that of disease. Several faults of management contribute to depress breeding efficiency. One of these is failure to detect signs of heat, especially in cows that do not show very obvious signs. This is particularly important in winter, when, under our conditions, cows may be stall fed throughout and may not be turned out and watched twice a day. In fact, only rarely do we find a farmer who will do this; he is usually content to turn them out once in the morning. But he is probably missing several cows that come in heat in the afternoon by adhering to this routine. Another management fault is breeding the cows back too soon after they have freshened. If this is done earlier than 60 days, even though the cows have cleaned properly, the chance of conception is lowered. If pregnancy does supervene complications are more frequent than they are in cows not bred so soon.

HERD RECORDS.

A still further fault lies in failure to keep good records. This is especially important in herds in which more than one bull is kept. We have encountered such herds in which the use of a poor bull has been allowed to continue for some time without his recognition as the liability he actually was. Along with this goes the all too prevalent custom of switching bulls in cows that return to service. This is a good way to spread any infection that may be present.

All this must seem very elementary to you, but these are things that depress breeding efficiency. We have a tremendous amount of educational work to do if we are to reduce losses from these causes.

DISEASE PROBLEMS

On the disease side brucellosis is no longer a major problem with us. Calfhood vaccination has reduced the amount of culling for this disease in the past 15 years from over three per cent. to considerably less than one per cent. (Asdell, 1951). Most of our work has been done in brucellosis-free herds and farmers have been somewhat puzzled because they still have abortions in their herds. We have found little trichomoniasis but we have encountered a good deal of vibrionic infection. Unfortunately, the agglutination test for this disease is not reliable at present. Standard strains vary in their titre from time to time. One strain we were using has become too sensitive and another not nearly sensitive enough. However, we believe that with experience we can point with considerable accuracy to an infected herd, and the disease spreads through a herd pretty soon. Such a herd usually has a series of services to many of the cows, then an interval of two to four months, one or two more services and a calf carried to term. Some obvious abortions occur, particularly in newly infected animals, but the greatest loss is caused by this breeding irregularity, as has been pointed out by Plastridge, *et al.* (1951). Other suspicious signs are cystic ovaries, particularly of the multiple variety difficult to treat, retained placentas, a high incidence of twinning, and especially, I believe, of like-sexed twins. For treatment we generally advise a sexual rest of 2 to 4 months, artificial insemination with semen containing antibiotics, and, when the uterus is obviously affected, a douche containing antibiotics.

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One large herd we visited was infected with both trichomoniasis and vibrio. We advised culling the worst offenders, slaughter of the three bulls, all of whom were infected, use of a new young bull on the virgin heifers exclusively, and artificial insemination for the rest. Within a year the breeding picture had changed from one in which not a single conception had occurred in the worst month to a better than average breeding efficiency. This herd has made a good object lesson.

Haematology.

During the course of this work we have compared the blood picture for a variety of components but good and bad breeders in the same herds do not differ in those we have estimated. The only exception is that in nymphomania the plasma protein rises, especially in the gamma globulin fraction. This had turned up in a special investigation of the physiology of the nymphomaniac (Wayman & Asdell, 1952), and we were on the look out for it.

Influence of Nutrition

Our work has been mainly in the better herds of New York State, and we have found only one in which we could definitely blame faulty nutrition for the conditions we encountered. In this herd everything was at fault. The cows were underfed, and the heifers especially so, the hay was poor in quality and there was a cobalt deficiency. We could not pin the troubles down closer than this. In fact we doubt whether faulty nutrition is a factor in sterility except in obvious cases like this one. The condition is a convenient "catch-all" when other possible explanations have failed. We believe that faulty nutrition is not to blame unless the animal shows definite signs of malnutrition. We are supported in this view by the fact that reproduction is but a small drain upon the system in the bovine. The amount of semen produced by the bull, about 5 c.c., contains very little dry matter. The ovum is insignificant while the cow puts on about 100 lb. of calf, etc., in nine months, far less gain than she put on during her growth period.

While I am on the subject of nutrition, I should like to give you an account of some work now in progress at Cornell. This consists of an attempt to decide how important the influence of calfhood nutrition is upon the lifetime reproductive performance of the cow. For this purpose week-old calves are assigned to the experiment in trios. One of each trio is given a ration poor in milk, with low quality roughage and pasture, and relatively poor management. The idea is to simulate conditions on the poorer farms and these calves get about 75 per cent. of Morrison standards, but the deficiency is overall, not merely an energy one. The next calf is fed and brought up according to the usual recommendations. The third is given extra milk, good hay and pasture, more concentrates and additional minerals and vitamins. These calves grow quickly but an effort is made to regulate the diet so that they do not become unduly fat. These dietary regimes continue until the heifers have had their first calves; then they are continued on regular farm rations for the rest of their lives. So far we have one definite result; that the sub-normal calves are much later coming in heat than the others but that they conceive very readily when they are served. They have great difficulty at calving and several calves from this group have been born dead or have had to be assisted away.

Inheritance.

Our workers in genetics have been paying a good deal of attention to the question of the inheritance of breeding efficiency. There are several ways of computing this but statistical treatment is difficult, especially when we try to combine records of absolutely sterile cows and those that eventually do conceive. It seems better to treat the two classes separately for statistical purposes. One has to have some idea of the amount of natural variation and this is expressed in figures such as the number of services required for conception and the calving interval. If inheritance is involved to any degree one would expect that a pattern of efficiency in a cow would be expressed in her performance at any time during her life. In other words, there should be some degree of repeatability in the record of the cow.

Dunbar (1950) has used non-returns in the New York State Artificial Breeders Co-operative as a measure. He found that the repeatability of a single record was ·027, which is another way of saying that this trait is almost a random one throughout the life of the cow Using this figure the estimate of heritability comes out at ·004, which is practically zero. On the basis of calving intervals heritability of fertility was zero. This work compared paternal half sibs.

Pou (1951) used the records of the United States Department of Agriculture herd at Beltsville, a herd that has been under close technical supervision for many years. Excellent records have been kept. In this work the following results were obtained for dam-daughter comparisons.

	Repeatability	Heritability
Regularity of heats ...	·18	·05
Services per conception	·12	·07
Days from first service to conception	·11	·07

These figures are so near zero that we must conclude that in cows that do conceive inheritance plays a very small part in their breeding efficiency. Certainly, with present methods of selection we cannot improve the cow population and if we try we may do harm by reducing the selection for other economic traits that are more susceptible to inherited factors. All this work was done under the supervision of Dr. C. R. Henderson.

Time of Ovulation.

Another aspect of our work has been to try to bring the time of ovulation under control. This stems from the work at Duke University with rodents that shows that L. H. release is partly under the control of a neurogenic factor. The cow, in which events in the ovary can be followed by rectal palpation, lends herself to this kind of work. My colleagues, Dr. W. Hansel and Dr. G. Trimberger (1951) have found that ovulation can be delayed by keeping the cow under the influence of atropine administered at the rate of about 15 mg. atropine sulphate per kg. of body-weight. They have also found that it can be hastened by injecting a small dose, 5 to 10 mg., of progesterone at the beginning of heat (Hansel & Trimberger, 1952). So far we do not know whether the eggs of treated cows are fertile when they are shed at these unusual times.

Hormone Investigations.

We are also engaged in an attack upon the variation of the amount of oestrogens in cattle under different conditions but we have encountered many analytical snags. So far

we have not anything of consequence to offer in this field; we have spent most of our time overcoming the difficulties of isolation and estimation. We do know that oestrone and oestradiol are present in the urine and blood, also a phenolic oestriol-like substance without oestrogenic activity. About one third of the oestrone appears to be conjugated in a form other than the sulphate or glucuronide. Oestradiol appears in the urine; if conjugated, it appears as the sulphate ; about equal quantities of free and conjugated oestradiol are present. The oestriol-like substance is present as a conjugate of unknown composition (Woods, 1950).

In blood plasma from a pregnant cow oestradiol, a non-ketonic phenolic steroid and 20-ketosteroids were found. All these were free, while a smaller amount of ketosteroids and oestrone were found in a protein-bound form. All these substances are found in minute amounts, much less than the corresponding substances in human blood and urine. This leads me to emphasize a point that we made several years ago; that the cow is the most sensitive animal known to ovarian and anterior pituitary hormones, while man is the least sensitive. In hormone therapy the cow dosage must be kept low. Human dosages are no criterion of what would be most satisfactory for the cow. We believe that a good deal of harm has been done to cows by indiscriminate large hormone dosages.

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DISCUSSION

Dr. J. A. Laing (Bristol), opening the discussion, congratulated Professor Asdell on his paper and said how fortunate the Society had been in having this opportunity to listen to him. Dr. Laing could not think that any member of the Society was not familiar with Professor Asdell's work; he was particularly interested to hear that in America they had problems of a very similar nature to those encountered in this country and that they had reached very much the same conclusions regarding them. There was, in this country, very general recognition that mass treatment of infertility did not produce results; we had come to appreciate that infertility was the result of a great variety of diseases, some specific to the reproductive organs and others of a more generalised nature. From this it had been realised that rational and effective methods of prevention and treatment depended on accurate diagnosis of basic aetiological factors. We had had our panaceas, such as indiscriminate oestrogen treatment, and, like Professor Asdell, had found them wanting.

Dr. Laing thought that everyone would agree with the point Professor Asdell had made regarding the educational problem in infertility. There was little doubt that where a herd was in charge of an intelligent and technically efficient stockman, whether he were the owner or an employee, things went very much more smoothly than otherwise. In this country, education in this direction had been very actively pursued since at least 1941, particularly with regard to accurate and consistent record-keeping. This was one of the things which stood very definitely to the credit of the old N.V.M.A. Survey Scheme. He was, however, inclined to doubt whether education in itself was more than a slight partial solution. It did increase the stockman's alertness with regard to abnormalities and allowed problems to be detected early and dealt with more efficiently. But apart from enabling animals to be seen in oestrus which might otherwise be missed, it did very little to prevent infertility. This was particularly the case with this problem which Professor Asdell had described as one of management—that of the herds where, especially in the winter-time, there was the greatest difficulty in identifying cows and heifers in oestrus. There had, in the past, been a tendency here to regard this as strictly a problem of day-to-day management. We had thought that these animals showed only slight signs of oestrus for a very short time which were not observed, whereas, if closer and more skilled attention had been given, oestrus would have been detected. This view had been supported by the fact that the cyclical development of normal-seeming corpora lutea could be followed in the ovaries of affected animals. But there was also evidence that in many cases, after the first *post-partum* service, this did not take place, but the corpus luteum persisted unchanged, although the animal was infertile because the developing embryo died. In addition, we could not be sure that oestrus did always occur in animals where cyclical ovarian changes were found. The fact that corpora lutea regularly developed and regressed was not sufficient to show this. Very often it might be that oestrus did not occur although a follicle developed, ovulated and a normal dioestrous corpus luteum was formed from it. No matter how carefully we observed, oestrus could not be detected in such cases. Considering all the facts together, it seemed that there could be a gradual transition in the plane of ovarian function from complete inactivity and anoestrum, through anovulatory cycles, suboestrum, delayed ovulation and embryonic death, to normal oestrus and ovulation. This was more a management problem in the sense that we were not providing an adequate environment for the cow, rather than in the fact that we did not observe her sufficiently closely. There was no suggestion that infectious disease was involved, but much information which indicated that disease of this sort was basically of nutritional origin, although whether it was due to a simple quantitative dietary deficiency or the lack of one or perhaps several specific dietary factors was as yet not clear. There appeared to be several predisposing or precipitating agents—abnormally low winter temperature, heavy lactation, severe internal parasitism; there were also some factors which tended to aid spontaneous recovery—increasing hours of daylight and a diet of young spring grass. The possible therapeutic effect of pasture oestrogen of course immediately came to mind. But it was quite likely that the beneficial effect of pasture lay in its general nutritive superiority over winter rations, rather than its content of any particular substance.

As in America, we now had very effective control of brucellosis as the result of vaccination with strain 19, although we had not gone nearly so far towards eradication of the disease. It was, however, no longer a serious problem, or need not be so long as vaccination was maintained. The same could be said for trichomoniasis which, he felt sure, had in many cases been controlled by artificial insemination without ever having been diagnosed. But, like Professor Asdell, we had come up against the problem of *Vibrio foetus* infection. Until recently this was regarded as a disease of late pregnancy, causing principally abortion and retention of the placenta. In the last few years a large amount of circumstantial evidence had been collected which indicated that it could also interfere with conception and, contrary to what was previously thought, might be transmitted venereally. Both these points had been confirmed following the study at Weybridge of experimental infections. Yet we did not know whether the venereal route was the only mode of infection or even whether it was the common route. As the result of the demonstration of the beneficial effect of streptomycin on the fertility of certain bulls, many people had jumped to the conclusion that this was the result of effective depression or of destruction of *V. foetus* present in the semen. So far as we knew at present this was a completely unwarrantable assumption. He said it would be very interesting to hear from Professor Asdell a little more concerning American views on the route of transmission of genital vibriosis. Dr. Laing's impression was that some work,

particularly that of Plastridge, indicated that other routes than the vagina might not be infrequent. The whole question, of course, was bound up with the difficult problem of diagnosis in both the male and female. Serologically different strains of the organism were known to exist, and *V. foetus* might also be agglutinated at relatively high titres by the sera of normal animals. So both false positives and false negatives might be obtained in agglutination testing unless care was taken in the choice of antigen and the dilution at which significance was attached to agglutination. In addition, isolation of the organism was difficult except from the placenta and aborted foetus, and from semen was purely a matter of good fortune, at any rate when the present methods were used.

He was very interested to hear what Professor Asdell had said of the inheritance of breeding inefficiency. In view of this, was it not possible that the average breeding efficiency of reputed normal herds with 1·85 services per conception was too low? Should it not be possible to aim at an efficiency of nearer 100 per cent? As so little infertility seemed to be inherited, surely it should be possible, by applying suitable measures, eventually to make all cattle breed at the first service, except the small proportion of genetically abnormal animals, which should not in any case be allowed to reproduce.

Mr. S. L. Hignett (Frant) began by congratulating both Professor Asdell on his paper and Dr. Laing on the able way in which he had opened the discussion. He said it must be appreciated by all present how little exact information they had on bovine infertility. There was an ever-pressing need for more fundamental work. Since they had been trying for years to get people to realise that the herd breeding problem was an exceedingly complex affair they derived much pleasure from the fact that the first two speakers accepted that this was so. Not only was the whole problem complex but a factor which seemed to be extremely important in one herd appeared to exert little influence in another.

They could assure Professor Asdell that all workers in this country would deprecate the indiscriminate use of oestrogens or any hormone preparation in the treatment of bovine infertility. These materials, as was well known to veterinarians, had to be used with great discretion and only on the basis of a good diagnosis backed by considerable clinical experience.

They had given some thought to the definition of the herd breeding problem and, at the present time, they used a fine mesh net—as Dr. Stableforth had described it. Even allowing for this, they were satisfied that a herd breeding problem existed in at least ten per cent. of dairy herds in this country—a figure which might well be in agreement with Professor Asdell's observation that ten per cent. of all cows were likely to be troublesome at any one time. It was true that in some herds a very high level of fertility was maintained. They therefore agreed with Dr. Laing that they must make their goal not the average conception rate but the highest conception rate.

It was encouraging to know that attention was really being paid to the importance of management in its effect on herd fertility. It was now universally recognised that failure to detect oestrus was a very important contributory factor to the herd breeding problem. This might be, and often was, due to the animal not showing signs of heat and, in other cases, to poor stockmanship on the part of the attendant. They had found that housed cattle on a ration sub-optimal for satisfactory fertility exaggerated the effect of the faulty feeding because it was much more difficult to determine exactly when to mate such cows and heifers. These animals might show some evidence of oestrus for several days. This was an important factor operating against the success of artificial insemination. When these animals showing evidence of prolonged oestrus were turned out with a bull he served them just at the right time and the conception rate, under these circumstances, might be equal to that of a normal group. Under the heading of management there could also be considered the amount of work expected of the stock bull, the number of times service should be permitted at each heat period, attention to feet and the provision of a suitable surface on which the bull could serve.

They were pleased that a great deal of emphasis was being placed on the importance of vibriosis. They believed that *V. foetus* infection was probably the most important single factor contributing to the herd breeding problem in this country. They would be the first to admit, however, that it seemed to cause much more trouble in some infected herds than it did in other infected herds. In connection with vibriosis there were certain anomalies which were extremely difficult to explain in the present state of their knowledge. As far as diagnosis was concerned, they were greatly indebted to Lawson for his work on the vaginal mucus agglutination test. They had found the bacteriological examination of foetal membranes an extremely valuable aid to diagnosis. If the breeding problem in the herd had existed for twelve months or more (and often such was the case by the time one was asked to investigate), they arranged to have sent to the laboratory portions of foetal membrane from the next ten or twelve animals to calve. If vibriosis existed in the herd and had been present for some time, examination of such specimens would usually reveal the organism. They would like to know on what evidence Professor Asdell concluded that cystic ovaries and twinning resulted from vibriosis. Might it not be that ovarian dysfunction led to increased incidence of twins and also rendered the animals particularly susceptible to *V. foetus* infection? Another matter of great practical importance was the strategy used by Professor Asdell to persuade his clients to rest from service for up to four months animals in a herd in which a great deal of time had already been lost. Could he enlighten them? In Britain, under certain circumstances, genital infection with *Corynebacterium pyogenes* and with the pleuropneumonia-like organisms could be associated with quite serious cattle breeding problems. They would like to know if either of these infections appeared to cause any breeding trouble on the other side of the Atlantic. They considered that much work remained to be done on this whole question of genital infection.

Dr. Laing had already crossed swords with Professor Asdell on the question of nutrition and its effect on fertility. Certainly some of them thought that nutrition did play a part in the herd breeding problem. As Dr. Laing said, this often resulted from sheer inanition. They even believed that, as far as certain nutritional disturbances were concerned, given a sufficiently large group of cows and heifers, a drop in fertility was the earliest sign of faulty feeding. Very little experimental work had been done on this aspect of bovine infertility. Here was a great opportunity for some really worthwhile team work. They should remember that nutrition covered much more than carbohydrate and protein intakes which, as far as they could see, influenced fertility only when grossly deficient or grossly excessive in amount. They knew from bitter experience that work on nutrition was so much more difficult than work on infection. Although it might not have such an important effect on reproductive efficiency, diligent endeavour in this field might well throw much light on other problems, such as mastitis and Johne's disease. Admittedly, in the end, it might very well be decided that, from the practical angle, it was simpler and more effective to control infective agents rather than environmental factors.

The heifer experiment described by Professor Asdell, whilst extremely interesting, quite obviously to those with experience of work in that field, told them very little. Information that one group of calves and heifers was being fed in such a way that they were getting about seventy-five per cent. of Morrison's standard gave no indication whatsoever of the actual intakes of vitamins A and D, of calcium, phosphorus, copper and of iodine—each of which might bear a relationship to fertility.

They noted Professor Asdell's remarks concerning the inheritance of breeding efficiency. Speaking from the farmer's point of view, it certainly seemed that, in this country, there were cow families with a history of low fertility. They were interested in the conditioning by nutritional and other stresses of an undesirable genetical character such as that for adrenal virilism. They would agree that in Britain a genetical factor only led to a herd breeding problem when it affected adversely the fertility of the stock bull. In this connection they would draw attention to Hancock's observations on certain blood lines in the British Friesian breed.

Professor Asdell, in his paper, had said little about bull fertility—a subject which was of paramount importance to many there that afternoon. In this country, impaired fertility of the bull frequently led to a herd problem and, in any investigation, the status of the bull should, as far as possible, be determined at the very outset. They would be interested to learn just how much importance Professor Asdell attached to bull infertility in the States.

They were extremely interested in Professor Asdell's work on oestrogen levels in body fluids. Having explored that field some years ago and having encountered what were to them insurmountable difficulties, they wished him and his colleagues every success.

It was a great pity Mr. Rowson was not there to cover his observations on the effect of certain hormones on the rate at which the ovum passed through the Fallopian tube.

Finally, in thanking Professor Asdell for addressing them that afternoon and in congratulating him on his most excellent paper, they would wish to endorse and underline his view that in any

hormone therapy in cattle the dose must be kept low, particularly when using oestrogens.

Mr. J. A. Moss (Bromsgrove) asked whether there was any evidence to show that *V. foetus* infection had been spread in the U.S.A. by means of A.I. and enquired to what extent *V. foetus* had been recovered from bull semen at Cornell.

Mr. G. F. Smith (Beccles) asked whether Professor Asdell, in the course of his investigational work, had found any evidence of seasonal trends in conception rate in view of similarity of climates between his own particular State and Great Britain.

Mr. Shaw (Wolverhampton) wished to thank Professor Asdell for his masterly summing up of the situation in regard to bovines as it occurred in the States. He said it was indeed good to hear that the situation both there and here was not greatly dissimilar. He was puzzled by the significance of the association of vibriosis with a high incidence of nymphomania and wondered whether Professor Asdell could elucidate further. He thought that the discovery of the presence of a neurogenic factor associated with ovulation in cattle was one of extreme importance, especially with regard to the technique of artificial insemination; had Professor Asdell come across any practical implication of this? He agreed wholeheartedly with the theme that the use of hormones therapeutically for the mass treatment of infertility in domestic animals was an outworn method of treatment. He thought that the use of hormones had been very much abused in the past and that it was time an effort was made to get down to fundamentals and to understand the reason for the various conditions caused by hormonal dysfunctions. Mr. Shaw considered Professor Asdell's remarks concerning the different ways in which bovines behaved reproductively each succeeding year to be very apt and said that he could endorse these views from his own limited observations on ovarian function. Many of the causes of abortion in the bovine were known, but this still left a large number unaccounted for. He asked if the Professor could give his views on some of the lesser known causes of abortion.

Mr. Stewart (Reading) said he was impressed by the speakers being so much in general agreement, particularly with regard to the limitation of their knowledge on the subject of infertility in cattle. However, he would like to hear further from Professor Asdell on the following two points. After his experience of using a mobile laboratory to visit farms, was he satisfied that it was a really useful approach to the problem? Secondly, when Professor Asdell had to deal with a fertility problem in a herd, and there was no obvious cause, such as an infection or infertility in the bull, what was his line of action, presuming he had to recommend something?

Mr. D. R. Melrose (Reading) asked if Professor Asdell could say if they had any evidence that infertility in dairy cattle was associated with high milk yields. Also, what line of treatment they would advise for nymphomaniac cows and what dose of streptomycin was used for intra-uterine treatment of *V. foetus* infected cows.

Mr. K. O'Sullivan (Stoke-on-Trent) referred to Professor Asdell's statement that they had found that heifers reared on a low plane of nutrition had been slow or late in coming on heat. He enquired whether this finding had been attributed to any particular food factor and what advice should be given to the farmer who had a bunch of heifers which were not coming on heat.

Dr. H. J. Cembrowicz (Ilminster) asked, with reference to Professor Asdell's description of the clinical symptoms of cows affected with *V. foetus*, whether he could describe the features in bulls: whether they showed high conception rates when measured at one month after service and then a considerable fall in conception rates when taken three months after service.

Mr. J. Smith (Writtle) mentioned Professor Asdell's reference to "Vibrio reactors" and said he would like to know what test was employed, according as to whether blood or vaginal mucus was used. He also asked what reliance was placed on the test.

Mr. G. H. Arthur (Streatley) said that although the similarities of the infertility problem in Britain and America had been stressed, in this country in areas where a high proportion of the cattle reacted to the tuberculin test genital tuberculosis in its several forms was still an important factor. He observed that Professor Asdell had not mentioned ovarobursal adhesions and diseases of the oviduct—affections with which British veterinarians were quite familiar. Some of these lesions were tuberculous in origin, but probably more than fifty per cent. had some other explanation. He enquired what was the incidence of this trouble in the U.S.A. where there was practically no bovine tuberculosis and asked whether Professor Asdell had any views on the causation of ovarobursal adhesions.

The Reply

Replying to the discussion, Professor Asdell regretted that it would take too long to do justice to all the searching questions that had been asked. He expressed his appreciation of the courtesy and pertinent comments of Dr. Laing and Mr. Hignett and observed that their two countries were obviously very close together in work and thoughts on the sterility problem.

With regard to the education of farmers, Professor Asdell believed that much remained to be done, especially in their work with the poorer farmers. He knew that when working in a herd in which the dairyman could go down the line and name each cow with minute details of her history and that of her dam they had a very different sterility history than they had in herds where this was not the case. The one man watched and cared for his cows and the other did not. They used their mobile laboratory as a research tool only and they did not treat the cows at all. They let the County Agent know when they were visiting a herd and invited the co-operation of the veterinarian. They worked very informally and exchanged ideas freely with everyone present. There was much interest in the district when they appeared and he was sure that much that they said was passed on to other farmers. When they had all their data in and analysed they sent a report to the farmer, the County Agent and to the practising veterinarians, with any recommendations they might have. Then it was up to the men on the spot to decide what to do. They did not compete with anyone and had no power to enforce anything. They were often invited by veterinarians to help them in difficult problem herds.

This education work, said Professor Asdell, was important, but they were also accumulating much information on breeding difficulties as they occurred in the field, especially on the relative importance of the various factors. This helped to guide them in their research. Eventually, too, they hoped to have data that would enable them to gauge the effects, if any, of soil types and management practices. If they had criticisms to make, they pulled no punches and if they were at a loss they did not hesitate to say so. Thus they had the confidence of all concerned. They were in the fortunate position that they did not have to get results on each cow.

In regard to nutrition, they had been working in herds that were mostly in milk testing circuits, where feeding was usually adequate, so they had come across few where nutrition could be blamed for the breeding difficulties. Where nutrition had been at fault there had been an overall nutritional failure: it could not be put down to one single factor. Professor Asdell believed that reproduction did not suffer until the cow showed overt signs of malnutrition. The drain on the system was small for reproduction in the bovine, the species differed from laboratory animals and pigs where the drain was much greater in proportion to body weight. There was too much tendency to blame nutrition when all other explanations failed. In their experimental work they had complete figures of feed intakes and analyses of the feed and these would be worked up eventually. But they were not working on specific deficiencies; other stations were taking that up. They were trying to simulate conditions on the best, average and the poorest farms in the State to see what effect they had on lifetime reproduction and production. When heifers did not come in heat, Professor Asdell believed that the best advice that they could give was still green pasture, sunshine, exercise and a young vigorous bull running with the heifers.

In regard to *V. foetus* infection, they agreed with Plastridge that the losses due to impaired conception were greater than those due to actual abortion. In their earlier work they seemed to have a pretty reliable antigen and they learned to associate a rather definite pattern of services with the infection, together with the ovarian cysts in herds with infection of long standing and the twinning. This was so much so that Professor Asdell believed that they could pick out infected herds with a good degree of accuracy. In reference to sexual rest, they could only advise and hope that the owners would have the sense to follow it. Professor Asdell did not have the details of doses of antibiotics used in douches. He was sure that his colleague, Dr. K. McEntee, Dept. of Animal Pathology at Cornell University, would be glad to answer enquiries about this. His work and that of Dr. Gillman showed that transmission was often through the bull but that some infections must occur by other routes. They were using the vaginal mucus test now and had also isolated the organism from bulls used in artificial insemination. This put control measures squarely upon those in charge of A.I. units. They also found that antibiotics in the diluters certainly helped the bulls with the poorer conception records. Their conception rates were based on the 60 day non-return figures. In general, bull infertility was a very difficult problem. The sterile bull was a very poor prospect for treatment.

Professor Asdell agreed that there were many other causes of infertility and abortions than *V. foetus*. Virtual eradication of brucellosis had merely uncovered the next most important factor. When they had licked this they would have many other things to work upon. They found ovarial bursal adhesions but they were not a major factor. He was sure that Dr. McEntee would be glad to supply details of their method for treatment of nymphomania, if approached. Professor Asdell explained that he, himself, was not the pathologist of their group.

They used the 1·85 figure for conceptions as that of the average herd. An average meant that 50 per cent. were better and 50 per cent. were worse. They used it to pick out the worse ones and also to tell farmers when they were well off. They did not always realise it. He thought the aim should be 100 per cent. at first service—as an ideal, of course. Replying to Mr. Melrose, he said they had no evidence that high yielders were more prone to infertility than the others. New Jersey was working on this and found no correlation with milk yield except in Ayrshires, but their figures were as yet scanty. He believed that breeding failures stood out in their thoughts more when they occurred in high yielders especially with their high prices for beef.

The question of cow families was a difficult one. It had to be shown that a succession of generations of good or poor breeders occurred more frequently than could be ascribed to chance. New Jersey and U.S. Department of Agriculture work rather put a damper on the idea of cow families. In all these statements it had to be emphasised that they were dealing with cows that eventually did conceive, not with absolute sterility.

Seasonal trends in conception rates had been found. Dr. Salisbury, at Cornell, had found poorer conception rates at the end of the winter but other States, mainly in the mid-west, had found the hot summer months the poorest.

They had not yet tested the fertility of eggs shed late as a result of atropine injections.

In conclusion, Professor Asdell thanked his audience for their patience and courtesy in listening to him.

THOROUGHBRED BREEDERS' ASSOCIATION AND STAMINA

Lord Rosebery's Denunciation of Modern Trend

In his presidential address to the Thoroughbred Breeders' Association at Newmarket on December 2nd, Lord Rosebery said that the greatest danger to our thoroughbreds was not so much the excellence of our rivals as the fact that the breeders in this country were going more and more for short-distance sires. "You cannot blame the breeders, or at any rate the breeders who sell their yearlings, which is nowadays the great majority. They have to cater for the public who buy them, and there is no question but that at the present time the public demand is for the short-running, quick-maturing animal out of which the owner hopes to get a dividend in its first season, and preferably in the early part of that. Economic conditions are responsible for this. It costs so much to train a horse these days that owners cannot afford to face the fact that the yearling they buy may not be ready to win a race until the autumn of its two-year-old career or even until it is three years old.

"Discussing informally with breeders at Doncaster, I asked them which were the stallions they liked, and they all without exception mentioned horses which, unless our ideas of breeding are all wrong, could not be expected to sire Derby winners.

"The reason why I am apprehensive of the French continuing to be a great danger in our Classics is because I notice they still stick to breeding from horses that are quite capable of siring animals able to win over a mile and a half at three years old. It is much easier to train an animal for a mile and a half race than it is for a two and a half mile race, and the shorter distance takes much less out of him. Moreover, in this case the mile and a half race is worth far more than double the two and a half mile one.

"One must, therefore, face the fact, which has no doubt been observed by the Ascot authority, that this race has reduced the importance of the Gold Cup from being a near-Classic to just another weight-for-age race. I am quite sure that breeders in the future will place the winner of the King George VI and the Queen Elizabeth Stakes on a higher plane than they will the winner of the Gold Cup, that is, as far as breeding from that animal is concerned. I do not want you to think that I am altogether pessimistic. Our thoroughbred mares are still unrivalled in the world, and when the economic conditions become better I have no doubt they will be suitably mated once more."

* * * * *

Weekly Wisdom

Plans are fine things when they are made for other people.—Lucilio in *The Spectator*.

THE URINARY EXCRETION OF VITAMIN B_1, RIBOFLAVINE AND NICOTINIC ACID BY THE DOG

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Introduction.

The requirements of the dog for the various members of the vitamin B complex have in the main been studied either by experiments involving the production of deficiency symptoms or by clinical observations on diseased animals. During recent years estimates of the daily requirements, or of the requirements in terms of gross food intake, of various B-vitamins by dogs have been reviewed by Morgan (1940), Rosenberg (1942), Michaud & Elvehjem (1944), Frederick & Gray (1947) and McCay (1949). The extent to which these data may be usefully employed, and the methods of application of the conclusions to everyday feeding practice in Great Britain are, however, open to discussion. It was felt that for an assessment of dietary requirements a metabolic approach possessed certain advantages. Normal dogs have therefore been maintained in a metabolism cage, and their urinary excretion levels studied while they have been provided with standard diets or known supplements.

This is the first paper of a series in which the effect of varying levels of B-vitamin intake upon the excretion of these vitamins or of their derivatives in the urine will be reported. It records the preliminary results obtained in the case of vitamin B_1 (aneurine, thiamine), riboflavine ("vitamin B_2") and nicotinic acid (niacin) when an unsupplemented diet was provided.

Materials and Methods.

The observations were made on six dogs (five male, one female), the individual details of which are given in the tables of results below. These animals were accommodated in turn in a normal type of metabolism cage designed to collect urine uncontaminated by faeces. The internal measurements of the cage were 55 inches by 42 inches by 32½ inches, including a raised portion 9½ inches high and 12½ inches broad at one end to allow for resting. The urine was collected every 24 hours and, after measurement of volume, was adjusted to *p*H5 with glacial acetic acid in order to prevent destruction of certain B-vitamins. In the case of each sample the vitamin B_1, riboflavine, nicotinic acid, inorganic phosphate and urea content was then determined. It was felt that information regarding the excretion of phosphate and urea would prove helpful in assessing fluctuations in the levels of the B-vitamins.

The various constituents were determined as follow: *Vitamin B_1 hydrochloride*.—The method employed was that of Jowett (1940), suitably modified to conform with the conditions of the experiment. Modification was necessitated in part by the presence of carotenoid and other pigments, and the following deviations were made from the technique described by Jowett: the sample was first extracted with *iso*-butanol to remove soluble substances, since it was found that this procedure reduced the urine blank to insignificance. In the oxidation of vitamin B_1

to the fluorescent thiochrome the reagents, concentrations and conditions conformed to those laid down by the British Pharmacopoeia, 1948, for the assay of aneurine hydrochloride. The final measurement of fluorescence was carried out, as in the B.P. assay, with the aid of a Spekker fluorimeter.

Riboflavine.—10 ml. of the sample of urine was acidified with 0.2 ml. of hydrochloric acid (36 per cent. w/w. HCl) and the mixture was extracted with chloroform to remove extraneous soluble material. From this point the procedure was that described by Kodicek & Wang (1949).

Nicotinic acid.—20 ml. of the sample of urine was taken and the method adopted was that of Wang & Kodicek (1943).

Inorganic phosphate.—The method employed was that of King (1932).

Urea.—The method employed was a modification of that of Marshall (1913).

Throughout the trials each dog received measured quantities of a diet comprising pressure-cooked rabbit meat, wholemeal bread and milk. The amounts fed, together with the water consumed, are given in the tables of results. The vitamin B_1, riboflavine and nicotinic acid contents of representative samples of the three dietary constituents were determined, with results as follows:

	Vitamin B_1 HCl (μg. per g.)	Riboflavine (μg. per g.)	Nicotinic acid (μg. per g.)
Wholemeal bread	3·7	2·0	25·4
Milk	0·17	1·37	1·0
Cooked rabbit meat	0·25	1·8	35·5

There are, of course, normal variations in the case of each of these foods and the results should therefore be regarded as typical levels and not as exact measures of intake throughout the experiments. It was felt, however, that for the purposes of the present study the dietary intake of the three B-vitamins was of an adequate order.

The vitamin levels in the above foods were determined by the following methods. The vitamin B_1 was extracted by the method of Kodicek & Wang (1949), and the determination completed by the method already described for the determination of vitamin B_1 in urine. The riboflavine was determined by the method of Kodicek & Wang (1949). The nicotinic acid was determined by a modification of the method of Wang & Kodicek (1943).

Results

Dog No. 1.—Pat : Mongrel, smooth-coated : Male.
Age ... ... Three years.
Weight ... ... 49 lb.
General condition ... Excellent.
Behaviour during test ... Exemplary.

Diet fed whilst under test :
Cooked rabbit meat ... 8 oz. per day.
Wholemeal bread ... 8 „ „
Milk ... ... 250 ml. „
Water ... ... 500 „ „

		Sample collected 24 hours ending : 21.5.52	22.5.52	24.5.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.) ...	0·44	0·45	0·39
	Riboflavine (μg. per ml.)	0·44	0·47	0·44
	Nicotinic acid (μg. per ml.)	2·85	3·03	2·2
	Phosphorus (mg. per ml.)	0·87	—	0·70
	Urea (per cent.) ...	2·95	3·27	3·09
	Volume of sample (ml.)	994	676	708
Results expressed as 24-hour output	Aneurine hydrochloride (μg.)	437	304	276
	Riboflavine (μg.) ...	437	318	312
	Nicotinic acid (μg. ...	2,825	2,050	1,506
	Phosphorus (mg.) ...	870	—	495
	Urea (grammes) ...	29·3	22·1	21·8

The dog behaved normally throughout and it will be seen that the results expressed per unit volume remained remarkably constant throughout the duration of the test. The figures for 24-hour output are also quite reasonably steady, with the exception of those for nicotinic acid.

Dog No. 2 also behaved normally throughout the test and the excretory levels of the various constituents studied are remarkably constant. It is interesting to note that on the two days on which urinary output was exceptionally high, there was no appreciable change in the concentration of any of the vitamins when expressed per ml. of sample. In consequence, the results expressed for the 24-hour output are correspondingly extremely variable.

Dog No. 2.—Kim : Mongrel, smooth-coated : Male.
Age ... ... 22 months.
Weight ... ... 42 lb.
General condition ... Excellent.
Behaviour during test Very good.

Diet fed whilst under test :
Cooked rabbit meat 8 oz. per day.
Wholemeal bread... 6 „ „
Milk ... ... 250 ml. „ „
Water ... ... 500 „ „

		Sample collected 24 hours ending : 17.6.52	18.6.52	19.6.52	20.6.52	21.6.52	22.6.52	23.6.52	24.6.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.) ...	0·36	0·30	0·27	0·40	0·43	0·40	0·37	0·44
	Riboflavine (μg. per ml.)	0·44	0·31	0·36	0·30	0·41	0·33	0·22*	0·30
	Nicotinic acid (μg. per ml.)	1·92	1·93	2·16	1·29	1·72	1·91	1·84	2·62
	Phosphorus (mg. per ml.)	0·88	0·90	0·63	1·01	0·79	0·90	0·62	0·95
	Urea (per cent.)	2·2	2·1	1·79	3·65	2·21	3·62	2·59	3·97
	Volume of sample (ml.)	424	908	518·5	956	439	794	750	616
Results expressed as 24-hour output	Aneurine hydrochloride (μg.) ...	153	272	143	383	189	318	281	271
	Riboflavine (μg.)	187	284	187	287	180	262	165*	185
	Nicotinic acid (μg.)	815	1,750	1,120	1,220	755	1,520	1,380	1,615
	Phosphorus (mg.)	372	816	329	970	348	720	470	585
	Urea (grammes)	9·35	19·1	9·3	34·9	9·7	28·7	19·4	24·4

* This sample was inadvertently exposed to sunlight and the results may therefore be somewhat low.

Dog No. 3.—Lynn : Golden Cocker Spaniel bitch.

Age ... ... Nine months.
Weight ... ... 25 lb.
General condition ... Very good.
Behaviour during test Highly unsatisfactory.
Diet fed whilst under test :

It is impossible to quote figures as the dog refused to eat and by 17.5.52 could only be coaxed to eat a little rabbit meat and some milk.

		Sample collected 24 hours ending :			
		12.5.52	16.5.52	17.5.52	18.5.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.) ...	0·21	0·26	0·16	0·32
	Riboflavine (μg. per ml.)	0·78	0·75	0·76	4·0
	Nicotinic acid (μg. per ml.)	—	—	—	—
	Phosphorus (mg. per ml.)	0·57	0·64	0·64	2·81
	Urea (per cent.) ...	1·9	2·44	2·55	—
	Volume of sample (ml.)	617	430	590	50
Results expressed as 24-hour output	Aneurine hydrochloride (μg.)	133	112	94	16
	Riboflavine (μg.) ...	482	322	450	200
	Nicotinic acid (μg.) ...	—	—	—	—
	Phosphorus (mg.) ...	352	274	380	140
	Urea (grammes) ...	11·75	10·5	15·05	—

The test was interrupted from May 13th to May 15th, 1952, and was discontinued at May 15th, 1952, owing to the fact that the dog was in such a miserable state that it was both impossible and unkind to continue the observations. This animal was temperamentally quite unsuited for use in metabolism tests and the figures are quoted as being of some interest for such a case. It will be seen that the urine output decreased to 50 ml. on the final day and that there was a corresponding rise in the riboflavine and phosphorus levels, but not to a comparable extent in the aneurine level. It is interesting to observe that, although the animal appeared distressed throughout, the figures when expressed per ml. of sample for the four constituents measured were remarkably steady for the first three days.

It will be seen that Dog No. 4 required one to three days to settle down under the conditions of the test. The excretory levels of the three vitamins were high initially but dropped to a steady value which was then maintained throughout the duration of the test. It will be noted that this latter value was of the same order as that given by dogs Nos. 1 and 2, which were in the lower size group and behaved similarly during the test. It will be noted further that the excretory levels attained during the series were similar, even though there was an interval of some six weeks between the tests, thus indicating that the results are repeatable: also that the dog took one day only to " settle down " in the second series, indicating that he was by then becoming familiar with the technique and less upset by the procedure.

Dog No. 4.—Scottie : Scottish Terrier : Male.

Age ... ... 21 months (1st series).
Weight ... ... 21 lb.
General condition ... Excellent.
Behaviour during test Excellent.

1st series : The diets fed to the dog for the six consecutive days of the test were as follow :—

Cooked rabbit meat 8 oz. 8 oz. 8 oz. 7½ oz. 8 oz. 8 oz.
Wholemeal bread... 5½ „ 6 „ 7¼ „ 8¾ „ 7½ „ 5½ „
Milk ... ... 250 ml. each day.

		Sample collected 24 hours ending :					
		7.3.52	8.3.52	9.3.52	11.3.52	12.3.52	13.3.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.) ...	0·78	1·43	1·43	0·62	0·34	0·55
	Riboflavine (μg. per ml.)	1·62	1·00	1·05	0·63	—	0·30
	Nicotinic acid (μg. per ml.)	2·2	3·4	3·6	1·7	—	1·64
	Phosphorus (mg. per ml.)	1·17	2·18	2·23	1·09	0·54	0·76
	Urea (per cent.)	5·4	2·6	3·03	3·2	1·41	2·4
	Volume of sample (ml.)	120	92·8	98·8	448	555	618
Results expressed as 24-hour output	Aneurine hydrochloride (μg.)	95	133	141	278	189	340
	Riboflavine (μg.)	194	92·8	104	282	—	185
	Nicotinic acid (μg.)	264	316	356	760	—	1,014
	Phosphorus (mg.)	140·5	202	220	490	300	470
	Urea (grammes)	6·5	2·4	3·0	14·3	7·8	14·8

2nd series : Diet fed whilst under test :

From 18.4.52 up to 22.4.52
Cooked rabbit meat 4 oz. per day.
Wholemeal bread... 6 „ „
Milk ... ... 200 ml. „
Water ... ... 200 „ „

From 23.4.52 up to 27.4.52
Cooked rabbit meat 8 oz. per day.
Wholemeal bread... 6 „ „
Milk ... ... 250 ml. „
Water ... ... 400 „ „

The diet was increased in quantity on 23.4.52 owing to the fact that the dog showed obvious signs of hunger.

		Sample collected 24 hours ending :								
		19.4.52	20.4.52	21.4.52	22.4.52	23.4.52	24.4.52	25.4.52	26.4.52	27.4.52	28.4.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.)	1·12	0·34	0·33	0·36	0·31	0·31	0·31	0·29	0·28	0·31
	Riboflavine (μg. per ml.) ...	1·42	0·55	0·44	0·31	0·44	0·38	0·34	0·27	0·32	0·28
	Nicotinic acid (μg. per ml.) ...	2·23	1·6	1·02	0·96	—	—	—	—	—	—
	Phosphorus (mg. per ml.) ...	1·21	0·9	0·64	0·62	0·74	0·69	0·90	0·68	0·70	0·74
	Urea (per cent.)	4·95	2·49	2·81	2·89	3·23	2·58	2·87	2·38	2·57	2·95
	Volume of sample (ml.) ...	148	380	282	434	362	566	567	724	496	592
Results expressed as 24-hour output	Aneurine hydrochloride (μg.) ...	166	128	93	156	112	176	176	210	136	184
	Riboflavine (μg.)	210	209	124	134	159	212	193	205	159	166
	Nicotinic acid (μg.)	330	607	288	415	—	—	—	—	—	—
	Phosphorus (mg.)	179	342	182	262	270	394	514	490	350	438
	Urea (grammes)	7·32	9·45	7·92	12·53	11·7	14·6	16·3	17·2	12·72	17·5

Dog No. 5.—Peter : Golden Retriever : Male.

Age	21 months.
Weight	74 lb.
General condition ...	Excellent.
Behaviour during test	Reasonably good.

Diet fed whilst under test :

	From 23.2.52 up to 29.2.52						
Cooked rabbit meat	9¾	9½	10¼	10	8½	12	8 oz.
Wholemeal bread...	8¼	8	8	7½	10¼	8	8½ oz.
Milk	300	300	300	250	250	250	250 ml.

		Sample collected* :				
		25.2.52	26.2.52	27.2.52	28.2.52	29.2.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.) ...	1·69	1·5	1·4	1·63	1·1
	Riboflavine (μg. per ml.)	1·26	1·25	1·02	0·83	0·72
	Nicotinic acid (μg. per ml.) ...	5·36	3·86	3·1	4·4	3·45
	Phosphorus (mg. per ml.)	2·71	2·55	1·85	1·67	2·01
	Urea (per cent.)	—	5·5	6·1	4·4	5·4
	Volume of sample (ml.)	639	337	368	345	347
Results expressed as 24-hour output	Aneurine hydrochloride (μg.) ...	1,080	505	515	562	382
	Riboflavine (μg.)	804	420	376	286	250
	Nicotinic acid (μg.)	3,420	1,300	1,140	1,518	1,198
	Phosphorus (mg.)	1,730	860	680	576	697
	Urea (grammes)	—	18·5	22·4	15·2	18·75

* The first sample was not collected until after a period of 60 hours (see note below).

Although the dog behaved reasonably well during the test, he was able to have only a limited amount of exercise and it appears that with the cage employed this dog was somewhat over the optimum limit of size. It will be seen from the table that there was the characteristic retention of urine during the early stage of the test, indicative of the psychological effect of being placed in the cage. However, the figures for this sample compare quite closely with the normal run of values throughout the test. It will be seen from the figures quoted for diet that this dog, in fact, received very little more food than dog No. 4 (the Scottish Terrier) and yet the urinary excretion levels were higher in the Golden Retriever than in the smaller Scottish Terrier that was receiving proportionately much more food. This would seem to indicate that lack of exercise results in decreased appetite and decreased utilisation of B-group vitamins.

Dog No. 6.—Paul : Golden Retriever : Male (littermate to Dog No. 5).

Age	21 months.
Weight	75 lb.
General condition ...	Excellent.
Behaviour during test	Good.

Diet fed whilst under test :

From 12.2.52 up to 15.2.52

Cooked rabbit meat :	10 oz.	8 oz.	9¼ oz.	8¾ oz.
Wholemeal bread :	7¾ „	5¾ „	7½ „	8¼ „

Milk : 300 ml. each day.

		Sample collected 24 hours ending :			
		13.2.52	14.2.52	15.2.52	16.2.52
Results expressed per ml. of sample	Aneurine hydrochloride (μg. per ml.) ...	1·6	1·54	1·23	1·43
	Riboflavine (μg. per ml.)	0·7	0·78	0·78	0·72
	Nicotinic acid (μg. per ml.)	4·2	5·3	5·7	4·4
	Phosphorus (mg. per ml.)	1·8	2·15	2·36	1·98
	Urea (per cent.) ...	—	—	—	—
	Volume of sample (ml.)	133	137	280	179
Results expressed as 24-hour output	Aneurine hydrochloride (μg)	204	206	344	256
	Riboflavine (μg.) ...	94	107	218	129
	Nicotinic acid (μg.) ...	564	726	1,600	790
	Phosphorus (mg.) ...	243	294	660	393
	Urea (grammes) ...	—	—	—	—

This dog was rather happier during the test than dog No. 5. There was no retention of urine and the excretion of B-vitamins remained at a similar level throughout. It is interesting to note that the excretory levels were as high as those of dog No. 5 on a similar diet.

Discussion.

These experiments were conducted primarily in order to establish " normal " excretory levels for the dogs in question and in order to condition them to the procedure prior to further trials involving variations in B-vitamin intake. The results have proved of considerable interest in so far as they indicate (a) the variation in excretory levels that may occur with size and temperament of dog, and (b) the remarkable consistency, when employing a given diet, of " established " urinary levels of the various metabolites studied despite daily fluctuations in the volume of urine passed.

The difficulty of collecting representative 24-hour samples of dog urine has been stressed in an earlier communication (Worden, 1939). There seems little doubt from the results presented in the present study that, even when a dog settles down well, a period of 24 hours is inadequate to establish urinary excretory levels and that a trial lasting for seven to ten days is preferable. It was not felt desirable in the present study to confine such active animals to the cage for longer periods than this.

The effect of unsuitable temperament was clearly shown in the case of animal No. 3, a highly-strung Cocker Spaniel bitch, which was discarded for further studies of this type. The effect of size was evident in the case of Nos. 5 and 6, the two Golden Retrievers, which although temperamentally satisfactory were too large even for the relatively commodious metabolism cage employed. Amoroso (1952) has drawn our attention to similar difficulties in studying the urinary excretion of 17 ketosteroids. The overall size of the metabolism cage is a factor that does not appear always to be taken into account in trials involving dogs, and models that are relatively too small are sometimes employed.

The lack of correlation between urinary volume and the concentration of the various metabolites studied is remarkable. Within quite wide limits the excretion of vitamin B_1, riboflavine and nicotinic acid in an individual dog appears to remain relatively constant despite considerable fluctuations in 24-hour urinary volume. Calculations based on output per unit volume, at least over periods

of 24 hours, may therefore be quite misleading and it would seem to be more accurate to express 24-hour output figures as a fraction of a longer period of study on a dog already adapted to the experimental conditions. A technique such as that employed by Brisson & Sutton (1951), who placed calves in metabolism cages for a 24-hour period each week while determining the urinary excretion of riboflavine, would appear not to be applicable to dogs.

In view of the relative consistency of excretion per unit of volume it would appear that, for clinical purposes, "snap samples" taken at random from individual patients may not be without their value in assessing deficiency or partial deficiency of the three B-vitamins in question. This is a matter that we have already begun to investigate, and the results obtained will be reported in due course.

In these studies it is very desirable to be able to relate the urinary concentration levels to the total excretion as between various bodyweights and types of dogs. This aspect will be studied in greater detail in a subsequent communication.

It has, of course, been evident since the work of Ackerman (1912) that the urinary excretion of nicotinic acid or its derivatives in the dog is a complex study, and indeed this worker was unable to detect either nicotinic acid or nicotinamide in the urine, but only trigonelline and nicotinuric acid. Huff & Perlzweig (1943) showed that N^1-methylnicotinamide was one of the principal excretion products derived from the metabolism of nicotinic acid in the dog (see also Perlzweig, Rosen, Pearson, Peck & Sparks, 1950), and several groups of workers have studied the pathways of excretion in various mammals and the relationship of dietary constituents, including tryptophane, to the quantitative urinary picture, those employing the dog including Singal, Sydenstricker & Littlejohn (1948); Ellinger & Abdel Kader (1949); Heidelberger, Gullberg, Morgan & Lepovsky (1949); Beyer, Russo, Gass, Wilhoyte & Pitt (1950); & Leifer, Roth, Hogness & Corson (1951); see also Kodicek (1952). The effect of diets deficient in nicotinic acid on the urinary excretion level of this vitamin has been studied by Harris & Raymond (1939). These aspects will be considered in later communications dealing with the fate of high oral dosage with nicotinic acid and related compounds.

Summary

(1) Six dogs of varying bodyweight have been maintained in a metabolism cage and provided with standard diets, and their urinary levels of vitamin B_1, riboflavine and nicotinic acid have been measured.

(2) It has been found that the size of the dog in relation to that of the cage is an important factor. The results obtained with two Golden Retrievers (74 to 75 lb. bodyweight) were significantly different from those with smaller dogs in a cage the internal dimensions of which were 55 inches by 42 inches by 32½ inches.

(3) Temperament has likewise been found of importance, and the dogs employed reacted in one of three different ways to being placed in the metabolism cage. Three settled down immediately and gave consistent results almost from the commencement; two others took up to three days before giving consistent results, while the remaining animal was psychologically completely unsuited and gave apparently erroneous results due in part to an upset in feeding habits.

(4) The urinary excretion of the three B-vitamins, and also of inorganic phosphate and urea, has been remarkably consistent when calculated per unit of volume. The excretory levels remained relatively constant even when the volume of urine produced varied greatly from day to day.

(5) Results based upon a 24-hour output of urine have been found to fluctuate considerably and therefore to be misleading. It would appear that total output should be related to periods of much longer than 24 hours in order to yield consistent and repeatable results.

(6) So far as can be judged from the limited number of trials reported, it has been found that excretory levels are similar in dogs of similar size, are independent of breed, and may be repeated on the same dog with the same diet. It is considered that observations for periods of from 7 to 10 days provide a satisfactory overall picture of excretory levels.

Acknowledgments:—We should like to acknowledge the assistance of Miss Maureen A. Baggott in caring for the experimental animals; also our indebtedness to Miss M. Hardaker for assistance with the analyses. We are grateful to Dr. J. H. Kodicek for much helpful advice.

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KENNEL CLUB APPEAL FOR THE ANIMAL HEALTH TRUST

Some twelve months ago the Committee of the Kennel Club decided to appeal for contributions for the Animal Health Trust, and since the date of that decision all Kennel Club forms have contained an appeal for donations to the Trust when sending registration transfer and all other fees.

The response to this appeal has been very satisfactory and the total amount collected over the twelve months, all in small amounts, is now well past the £1,000 mark.—*Kennel Gazette.*

* * * * *

According to figures quoted at the annual meeting of the South Co. Dublin Society for the Prevention of Cruelty to Animals more than 21,000 horses were exported from Eire during the first six months of this year. Total for the whole of last year was 35,740.

THE VETERINARY RECORD
December 20, 1952

INFERTILITY IN CATTLE

COMPARISONS between methods adopted in different countries to combat diseases or errors in husbandry are always interesting, generally instructive, sometimes salutary and may even be humiliating. Professor Asdell's address, published in this issue, will be read by veterinary surgeons in Britain with great interest and with benefit; perhaps it may raise in the minds of some the feeling that it would be of advantage in this country to be able to call upon a full team of experts to help with the more refractory cases of herd infertility.

Study of the paper, the able discussion and the comprehensive reply, reveals clearly that many of the herd problems on the other side of the Atlantic, at least in the Eastern States, are very similar to those in Britain. There is apparently the same incidence of infertility; there is no easy or universal remedy; there is the same emphasis upon the importance of the herdsman's ability; there are not dissimilar systemic disease problems; there are equally wide variations in the levels of bovine nutrition; there is realisation that hormone administration can be very disappointing, and even harmful; and there is, with all respect, still a very great deal to learn.

Mention of the comprehensive range of related investigations which are being pursued by Professor Asdell's colleagues, leads to the hope that much of what at present is mere surmise may be put on a more scientific basis when they are completed.

Two very controversial considerations may be worthy of comment; one was debated, the other was barely mentioned. It is obvious that our American colleagues are not at all convinced that the more detailed elements in nutrition are themselves of much importance, provided the overall intake is reasonably adequate. Veterinarians in Britain are at present somewhat divided in their views as to whether or not minerals, vitamins, amino-acids, or other principles excite a profound influence on fertility, either in the individual or the herd. The facility with which cows and heifers breed in the more remote hill areas, where the refinements in nutritive supply are low, but where natural mating usually takes place, lends weight to the view that these minutiae cannot be so all-important, while the fact that most of the intensively managed dairy herds, where infertility is often a serious problem, are far better fed, must be borne in mind.

Despite many suggested causes of physiological infertility it is very evident that recent advances in our knowledge of infectious infertility must not be overlooked. It may well be that in the not too distant future this type of breeding irregularity once more will exercise the minds of many workers both in this country and America, for with the adequate control measures now available to us in combating Brucellosis, many infectious breeding problems, in the past remaining un-noticed, may show up in their true virulence.

The other controversial topic which was not well discussed concerns the general question of environment, comfort and contentedness of the cows. Much attention is now being paid to all those general and detailed criteria which, added up, compose the herd environment and which embody such phenomena as the constancy of the temperature, aerial humidity, regularity in milking, feeding, grooming and other cowshed routines, comfort and contentment of the cows, and so on. Neurological influences may exert more profound effects than at present we appreciate. The reproductive systems of the cow may be influenced by psychoses, and a psychosis which delays or arrests ovulation may be a fundamental cause of infertility in some individuals.

Several research centres in Britain have been enabled during recent years to devise and build special animal environment rooms, and some are being used for cows. Evidence already is accumulating that the reproductive organs in some species function far more efficiently when the environment is standardised to conform to what is regarded as ideal, and further knowledge may perhaps enable us to explain why some 10 per cent. of all cows are likely to be infertile at any given time, even though it may not enable us to overcome or control this 10 per cent. "hard core." In any case, the results of all these investigations will be awaited with interest.

CLINICAL COMMUNICATION

SOME OBSERVATIONS ON RINGWORM IN CALVES DUE TO *TRICHOPHYTON DISCOIDES* SABOURAUD

BY

C. J. LA TOUCHE

(Lecturer in Medical Mycology, Departments of Dermatology and Bacteriology, University of Leeds)

During the past three years commencing in May, 1949, a total of 24 patients with calf ringworm, confirmed microscopically and by culture as being due to *Trichophyton discoides* Sabouraud, have attended the skin clinic of the Leeds General Infirmary. From four of these who did not live or work on a farm, information as to the possible source of infection was not obtainable, while one of them reported contact with a mangy sheepskin which he was dressing; 19 reported that ringworm was present on the farm where they were employed or resided. Specimens of calf hair and scales sent to me by seven of the patients were all invaded by a large-spore type trichophyton fungus and *T. discoides* Sabouraud was obtained from each of four of the specimens which were cultured.

The farms on which infected cattle were said to be present are all in Yorkshire and most of them are in the vicinity of Leeds. Some of them which I visited had a high proportion of infected calves; on one farm there were 25 calves aged from one to two months and all had ringworm lesions.

Description of Ringworm Lesions in Calves

The ringworm lesions in calves, as so far observed, were scaly, more or less circumscribed areas, measuring up to several inches in diameter, but in many cases coalescing to form several much larger areas; they were initially white but many had become yellowish or brownish due to contact with dirt. Desquamation was frequently so marked that the scales which were matted together were heaped up to form a raised plaque on the surface of the lesion. Included in the plaques were numerous hairs which were easily removed along with the accumulated epithelial debris.

Sites of Infection

The most frequept site of infection was the head, especially the skin and hair of the face: above the muzzle, around the eyes and at the base of the ears; but other parts of the body surface were also frequently affected (Fig. 1 overleaf).

General Microscopic Appearance of Material Obtained From Ringworm Lesions in Calves

For microscopic examination small pieces of the material obtained from the lesion are mounted on a microscope slide

Fig. 1

in 10 per cent. caustic potash solution and covered with a coverslip. This preparation is then warmed gently over a flame in order to accelerate the softening and dissociating action of the caustic potash solution on the scales. In such a preparation the following gross features may be observed at a low magnification:—

Each hair shaft is surrounded for a varying extent along its length by a stratified funnel-shaped sheath composed of epithelial cells which have gradually accumulated around the hair shaft as part of the excessive desquamation of the stratum corneum (Plate 1a). During the mounting of the material, parts of this sheath may be torn off the hair so that its continuity along the hair shaft may be interrupted; this is shown on the left in Plate 1a by a portion of hair shaft which also carries fungus material represented by the darker parts along its length. As shown on the right in the same illustration by the clearer patch of material around another portion of hair shaft, a variable amount of pus acts as a cement so that the hairs with their sheaths of epithelial debris appear in bundles in the preparation. Young hairs which are short, scarcely project beyond the upper margin of the ensheathing epithelium ; mature hairs which are long, project considerably beyond it. The roots of many long mature hairs may be observed projecting through the lower margin of the general epithelial accretion; some of these still retain the inner epithelial sheath with which they were surrounded in the hair follicle, and some of them are complete with bulb while others have been separated from it.

Appearance of Ringworm Fungus in its Relation to Calf Hair

If the preparation which has just been described in general terms is allowed to macerate for some time, preferably for a few hours, the stratified epithelial debris around the hair shafts will have become more or less disorganised and transparent, revealing quite clearly the parasitic fungus on some of the hair shafts. The picture presented by the fungus on the hair shafts varies considerably, especially according to the stage of invasion or the duration of the lesion, but in material from a well-developed lesion some of the hair shafts will almost certainly show a superficial mosaic-like layer of variable density, composed of innumerable, colourless but highly refractile granules. This layer partly or totally covers and obscures a very variable surface area along the hair shaft in its lower portion ; it is called the spore-sheath. The refractile granules of the spore-sheath are the so-called arthrospores which are rounded and relatively large, measuring from about 2 microns (1 micron=1/1,000 mm.) to about 6·5 microns in the photomicrograph here reproduced (Plate 1b), but diameters up to 8 microns may be recorded for this species of trichophyton. They are developed from thread-like elements (hyphae) of the fungus which grow downwards along the surface of the hair shaft as well as downwards along the inner surface of the innermost epithelial layer surrounding the hair shaft. At an earlier stage of their invasion of the epithelium and hair these hyphae consist of sparingly branched cylindrical threads with a relatively small number of transverse partitions (septa) within them; they become in due course closely septate, forming rows or chains of subcubical or subspherical segments as may be seen on the part of the hair shaft shown in Plate 1c. Many of the arthrospores of the spore-sheath are isolated, but a great many also lie in chain-formation although the identity of these chains is obscured by their superposition and juxtaposition. The spore-sheath may reach considerable thickness as may be seen in Plate 1d where it projects on either side of the hair shaft. By careful manipulation of the coverslip overlying the preparation the spore-sheath may be displaced from the surface of the hair shaft which then may be seen to be more or less free of superficial fungus growth or may show only a few closely septate hyphae. Frequently, in this sort of preparation, the spore-sheath is seen to be surrounded by a cellular membrane consisting of the innermost layer of the desquamated epithelium around the hair shaft or sometimes of the inner epithelial layer of the hair follicle which was removed with the hair during the collection of the material from the lesion. In Plate 11e an epithelial membrane is shown split in half vertically, the two halves lying on either side of the hair shaft, each with, adherent to it, a part of the spore-sheath which has been displaced from the hair shaft.

Each arthrospore making up the spore-sheath is potentially capable of producing a new fungus organism and is therefore a reproductive unit.

The fungus grows also inside the hair which it penetrates to various depths, passing first of all between the scales of the hair cuticle ; inside the hair, the hyphae are sparingly branched and sparingly septate; some of them may just be discerned in Plate 11f along the middle course of the hair shaft as dark sinuate threads immediately beneath the cuticle. By the time that the spore-sheath is formed they are very indistinct and may be seen only with careful focusing of the microscope. Sometimes the hyphae may grow down into the hair bulb although again here they may be seen only with difficulty (indicated by white arrows in Plate 11g).

Appearance of Fungus in Epithelial Debris

In the epithelial debris, in the immediate proximity of the hair shafts and remotely from them, there may be seen a variable amount of fungus in the form of hyphae which are either sparsely septate (Plate 11h) or closely septate. They are usually more abundant and more obvious in younger lesions, tending to die out and become indistinct in older lesions.

In conclusion, I must emphasise, by repetition, that the appearances of this fungus in the hair and in the scales are very variable, and must state furthermore that the descriptions and illustrations given here relate to my own observa-

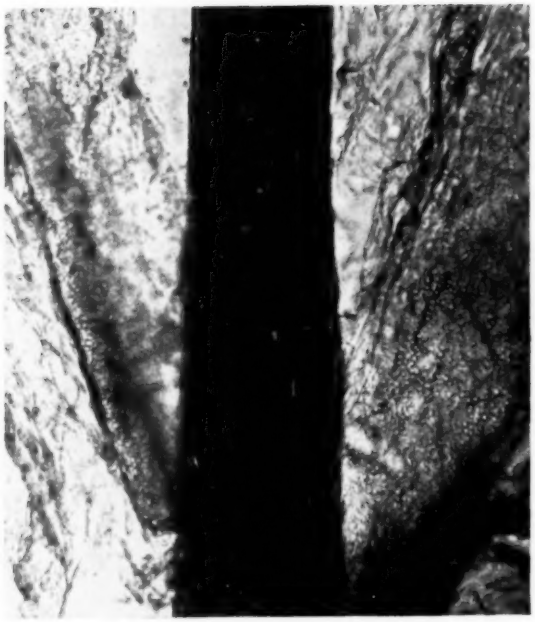
a

b

c

d

PLATE I



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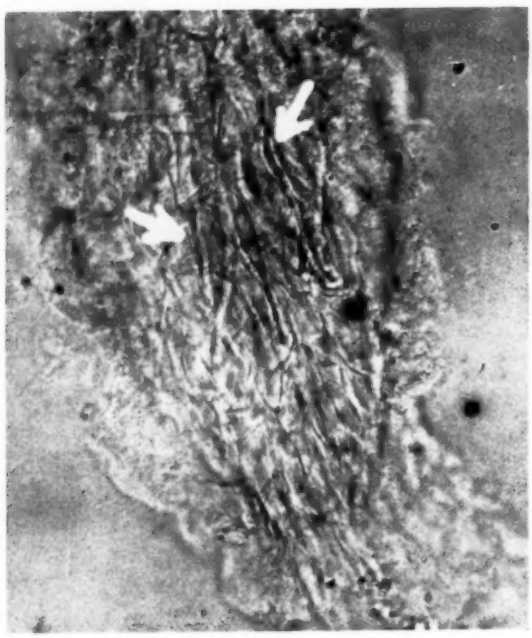
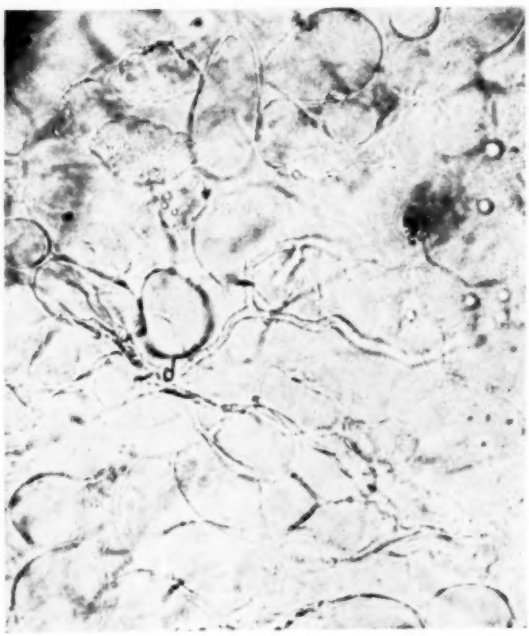


g



h

PLATE II

tions of what in my opinion are the more common macroscopic and microscopic features which may be observed in the superficial part of ringworm lesions in calves due to infection by *T. discoides*. Lastly, in order to avoid possible misunderstandings, I must add that ringworm in calves may be caused by at least one other species of trichophyton, *T. mentagrophytes*, but which I have not encountered in any of the material obtained by me in the neighbourhood of Leeds.

(All photomicrographs were taken from material mounted in 10 per cent. caustic potash solution.)

Acknowledgments.—My sincere thanks are due to Dr. Ingram for his encouragement and permission to publish this article; to clinical photographers Mr. A. Pegg and Miss M. Barrett for their painstaking collaboration in developing and printing my photographs and photomicrographs, and to my technician Mr. R. Forster for much technical assistance.

DESCRIPTION OF ILLUSTRATIONS

Fig. 1.—Calf with extensive ringworm lesions around the muzzle and eyes, at the base of ears and on the neck.

Plate 1a.—On left: infected hair shaft surrounded by desquamated epithelium; on right hair shaft surrounded by desquamated epithelium and patch of pus. Magn. x 50.

Plate 1b.—Spore-sheath around hair shaft. Magn. x 514.

Plate 1c.—Closely segmented hyphae on surface of hair shaft. Magn. x 514.

Plate 1d.—Spore-sheath around hair shaft projecting at sides. Magn. 300.

Plate 11e.—Hair shaft and split epithelial membrane with adherent spore-sheath. Magn. x 200.

Plate 11f.—Mycelium inside hair shaft immediately below cuticle. Magn. x 514.

Plate 11g.—Mycelium inside hair bulb. Magn. x 514.

Plate 11h.—Sparsely septate mycelium in epithelial debris. Magn. x 514.

REPORT

British Council Report, 1951-52

The principal aim of the British Council is to promote a wide knowledge of the culture and science of this country abroad. The funds allocated to the Council have been reduced considerably but the report indicates that it is still able to support a very wide range of interests. It has continued to aim at a closer understanding with other countries through general and technical education, the arts, sciences, medicine and agriculture, and through exchanges of visits between persons of every age and occupation. A wide variety of work has also been done for the welfare of overseas students in the United Kingdom. This is an important and growing activity, for the number from the Colonies has increased from 800 in 1939 to over 5,000 and an almost equal number come from India, Pakistan and Ceylon.

Sections of the report are devoted to its activities in foreign countries and others to its work in the Commonwealth. In the agricultural field the Council organises courses for overseas visitors and continues to publish the *British Agricultural Bulletin*. It also collects for distribution information on scientific research in British Universities.

A clear account is given of the organisation of the British Council and although no specific reference is made to the work of individual committees it is gratifying that a Veterinary Panel has been set up and that there are veterinary representatives on its Agricultural and Medical Advisory Committees.

F. B.

REVIEW

[Memoirs of a Veterinary Surgeon. By REGINALD HANCOCK. Pp. 224, with nine illustrations. (Macgibbon & Kee, Ltd., London.) Price 15s.]

This is a very interesting book by a veterinary surgeon of nearly 40 years' experience in peace and in war and reared in a truly veterinary atmosphere. His father and grandfather were both veterinary surgeons. Thus his narrative begins from his very early days. The first portion concerns his childhood, school days and adolescence, and the latter his college days at the Royal Veterinary College, London, his experiences on active service during the 1914-18 war and subsequently in general practice with its steady and inevitable transition from an old-fashioned country practice at Uxbridge—about 15 miles from London—into an entirely different type of suburban practice. Two main causes were responsible: the gradual but very marked depletion of horses and the change of the little interesting country market town almost into a dormitory town for the great metropolis. Incidentally, Uxbridge sportsmen may not be very pleased to hear that the author's father, himself a good sportsman, was captain of the town's "soccer team before its professional days," for we have good reason to believe that Uxbridge Association Football club is not, and never was, a professiona organisation.

The story of Reginald Hancock's early days is remarkably well written and most entertaining to read: the reviewer found himself chuckling very often at the humorous incidents related even though mixed with some pathetic instances. The later descriptions of his war-time experiences make most interesting reading and so, too, do so many of the experiences in general practice. The immense esteem in which he held Sir John M'Fadyean and Major-General Sir Fred Smith will be appreciated by all who knew those remarkable giants of the veterinary profession of the early present century.

We are, however, most impressed by the author's long but ultimately successful fight for the profession he was more or less forced to adopt against all his innermost inclinations and convictions and to sacrifice a preferred musical career. The recounting of it however has rather more self-pity than necessary. He ultimately attained the honour and distinction of the Presidency of the National Veterinary Medical Association (now the British Veterinary Association) and carried out its duties and responsibilities with great dignity and success.

In our view this is a most interesting and readable volume, and we believe it would be a welcome inclusion in the list of Christmas or New Year presents to both professional veterinary readers and many lay readers who appreciate a well-told narrative on a subject on which there is at present very little real knowledge amongst laymen. It is delightfully illustrated by Miss Elaine Hancock.

HOMOEOPATHY IN VETERINARY PRACTICE

At a meeting of the Faculty of Homoeopathy held at the Royal London Homoeopathic Hospital on December 4th, a paper was read by Miss M. Fussell, M.R.C.V.S., entitled "Homoeopathy in Veterinary Practice." A lively and prolonged discussion, opened by Major R. C. G. Hancock, B.SC., M.R.C.V.S., ensued.

The medical men who contributed their experiences were full of praise for the paper, and hoped the visit of their veterinary friends would be soon repeated. Sir John Weir, G.C.V.O., M.B., CH.B., F.F.HOM., stated that he thought the meeting the most interesting for many years, and subsequently entertained the veterinary visitors to dinner. It is hoped that on subsequent occasions more members of the profession will attend these joint meetings, since it is known that some 30 veterinary surgeons are interested in this school of thought.

XUM

ABSTRACTS

Caesarean Operation in a Mare*

A case of dystokia in a hunter mare due to foetal hydrocephalus was the subject of a successful caesarean operation in spite of many unfavourable circumstances.

Anaesthesia was by intravenous chloral hydrate, and the 17-inch incision was made in the right flank. Foetus and membranes were removed with difficulty. Suturing was orthodox.

After operation, 3,000,000 units of penicillin were given daily for seven days and 1,000 c.c. of whole citrated blood daily for four days. Metritis was treated by tamponage and by "triple sulpha cream" locally. The mare also received two doses of stilboestrol and two of pituitary extract.

She regained her feet after two days. There was necrosis and separation of skin wound and some muscle layers. General condition, however, improved steadily and the wound gradually healed by granulation.

J. A. L.

* **Foetal Dystokia and Successful Caesarean Operation in a Mare.** Farquharson & Delahanty. (1952.) *J. Amer. vet. med. Ass.* **120.** 129-130.

* * * * *

A New Anaesthetic Technique for the Horse*

The authors adopted cyclopropane-oxygen anaesthesia for the immobilization of ponies for radiological investigations and for operations. The requirements they sought were that the anaesthetic should be safe in use, that it should be usable in a confined space, that it should be capable of maintaining smooth anaesthesia for long periods and enable apnoea to be produced while X-ray photographs were taken, that it should be possible to terminate the anaesthesia immediately, and finally, that recovery should be tranquil and rapid.

Cyclopropane-oxygen fulfilled these requirements.

Technique

As cyclopropane has to be administered by the closed circuit technique without leakage in the circuit, it is necessary to employ intubation whereby the anaesthetic gas is introduced directly into the trachea by a correctly sized tube having an inflatable cuff. Such a tube is inserted through a specially designed mouth gag and connected to a standard cyclopropane circuit tubing using a Heidbrink machine. In the circuit are a soda-lime canister for the absorption of CO_2 and a rebreathing bag.

Anaesthesia is induced speedily by a rapid intravenous injection of "Sagatal" and then the trachea tube is inserted and the cyclopropane-oxygen mixture turned on.

The depth of anaesthesia is controlled by varying a proportion of cyclopropane and oxygen.

It was found that anaesthesia and respiratory movements could be exactly controlled and that apnoea could be produced for a few moments by compressing the rebreathing bag, whilst at need pure oxygen could be given.

At the end of the anaesthesia the gases are cut off and the trachea tube left in position for the few minutes required for recovery of consciousness. The ponies were able to support themselves upright on the ground after about 10 minutes and to get up after a further 10 to 15 minutes. No complications have been encountered in the anaesthetising of 14 animals.

It appears that the amount of cyclopropane needed for a 240 lb. pony is quite small—1½ to 1¾ litres to establish anaesthesia and a like amount per hour to maintain it.

J. E.

* **A New Anaesthetic Technique for the Horse. A Preliminary Note on the Use of Cyclopropane-Oxygen Anaesthesia.** Dyce, K. M., Jones, O. G., & Wadsworth, F. J. (1952.) *Brit. Vet. J.* **108.** 187-191.

* * * * *

Heart Disease in Dogs*

The scarcity of published work on cardiac disease of the dog makes it difficult to assess the criteria upon which an accurate diagnosis can be made. It follows from this that in practice prognosis is equally hazardous and tends to be unfavourable, and that the owners of affected dogs are discouraged from prolonged treatment.

In this symposium of the available knowledge on this subject Professor Dertweller has drawn from 77 references, and from the clinical material presented to the School of Veterinary Medicine, University of Pennsylvania. The result is a well-marshalled guide of considerable value to teachers, students and practitioners.

For the first two this symposium describes and evaluates all the known techniques for the examination of the canine heart, many of which are of laboratory interest—as, for example, cardiac catheterisation, the purely artificial alteration of the heart-rate and the comparison of observed sounds with stethoscope gramophone records. For the practitioner it describes in detail the comprehensive examination of the heart by an extension of methods already generally practised, and within the power of any practitioner who is willing to devote the requisite time and patience, and to attempt a systemic evaluation of what he observes.

Disturbances in heart-rate and rhythm, some important types of cardiac disorders, cardiac hypertrophy, vitamin B_1 deficiency, trauma and congestive heart failure are adequately described, including pentobarbital anaesthetic toxicity in cases of pericarditis.

The administration of digitalis is presented on an accurate dose/bodyweight basis which is greatly at variance with the system usually adopted in this country, and the condensed chart of the more important arrhythmias in itself would make this monograph valuable reading.

J. P.

* **Heart Disease in Dogs.** Dertweller, D. K. (1952.) University of Pennsylvania Bulletin. No. 125.

SHEEP HUSBANDRY RESEARCH IN NEW SOUTH WALES

In its issue of December 6th, *Nature* records that a new sheep biology laboratory has recently been set up at Prospect, near Parramatta, New South Wales, by the Commonwealth Scientific and Industrial Research Organisation, and Professor C. W. Emmens has been appointed as officer-in-charge. Professor Emmens has a distinguished record as an animal physiologist and was for many years engaged on research at the National Institute for Medical Research, London; concurrent with his new post, he will continue his present work as professor of veterinary physiology in the University of Sydney. The Prospect Laboratory will concentrate on problems of fertility and reproduction, the physiology of wool production, and sheep breeding and genetics, and it is hoped eventually to build it up as a leading world centre of information on all scientific data relating to sheep and wool husbandry, particularly the Merino and other types specially evolved in Australia. A balanced programme of both laboratory studies and field investigation is planned to develop the potentialities of healthy sheep in terms of quality and quantity of fleece, higher lambing percentages and the breeding of specialised types. Linked with the central Laboratory will be a series of sheep and wool field-stations in the major wool-producing regions, equipped to study all relevant aspects of soils, pastures, animal husbandry, disease control and plant and animal management. The laboratory is being established on an area of 130 acres which has been carefully selected to provide good potential for pasture management and improvement and space for the cultivation of fodder crops. The full building programme will not be complete for some time, but sufficient laboratory accommodation and animal houses, feed stores, fleece and shearing sheds are now available in prefabricated buildings to enable research to be started.

QUESTIONS IN PARLIAMENT

Psittacosis

Mr. Wyatt (December 11th) asked the Minister of Health whether he is aware that Mr. F. N. Clark, employed by Lewis's Store in Birmingham, has died from psittacosis contracted from two parrots in his charge at the store; that the two parrots were sold on Thursday, December 4th and have not yet been recovered; and whether he will reimpose the ban on the import of parrots which was lifted by him in January of this year, after being in force for 21 years.

Mr. Teeling (December 11th) asked the Minister of Health whether his attention has been called to a suspected case of psittacosis, parrot disease, now in Sussex County Hospital, Brighton; what are the steps his Department take normally in such circumstances; whether he will reimpose the ban on the entry of parrots into this country; and why it was originally raised.

Mr. Iain Macleod: The cases referred to have come to my notice and are being investigated. In neither case has psittacosis so far been established. The ban was removed because psittacosis was found to exist among many other birds in this country—but its re-imposition can always be considered if it should prove necessary.

Fowl Pest

Mr. Crouch (December 11th) asked the Minister of Agriculture how many cases of fowl pest have occurred in the present outbreak; how many counties are affected; what has been the number of birds destroyed; and the amount of compensation paid.

Sir T. Dugdale: Since November 28th there have been 119 outbreaks in 36 counties. About 55,000 birds have been destroyed; the compensation payable is about £55,000.

Mr. Hurd (December 16th) asked the Minister of Agriculture what losses had been suffered to date in the epidemic of fowl pest.

Mr. Nugent (Parliamentary Secretary): Since November 28th about 67,000 birds and 168,000 hatching eggs have been destroyed; the compensation payable is about £82,000. The department keeps in close and constant touch with developments abroad. Vaccination is only practised in countries or areas where fowl pest has virtually become endemic. In those circumstances, the use of an appropriate vaccine reduces the losses considerably, but the Minister has no information about the cost. In this country we are aiming at the complete eradication of the disease, and there is nothing in the experience of other countries to suggest that vaccination would help us at present.

Lieut.-Colonel Lipton asked the Minister of Food whether, in view of the effect of the outbreak of fowl pest on egg production, he would reconsider his decision to end egg rationing in the spring.

Major Lloyd-George.—I understand from the Minister of Agriculture that although the future course of this outbreak cannot be forecast with certainty, it is unlikely to have any appreciable effect on the total supply of eggs. The second part of the question does not therefore arise.

Anthrax

Mr. Crouch (December 11th) asked the Minister of Agriculture what compensation is paid to the owners of animals that die of anthrax.

Sir T. Dugdale: None. I have no power to pay compensation to farmers whose animals die of disease. Compensation under the Diseases of Animals Act is payable only when animals are slaughtered by order of my Department to prevent the spread of disease.

Battersea Dogs' Home

Mr. Peter Freeman (December 11th) asked the Secretary of State for the Home Department how many dogs were sent to the Battersea Dogs' Home last year by the police; what is the total amount allowed by the police for the maintenance for these dogs per head per week; when such an allowance was fixed originally and what increases have taken place since that date; and what steps are taken by the police to discharge their statutory obligations and ensure that the dogs sent to this home during the period of their responsibility are maintained in a healthy condition and segregated from other dogs suffering from disease.

Sir D. Maxwell Fyfe: Sixteen thousand six hundred and twenty-three stray dogs were sent by the Metropolitan Police to the Battersea Dogs' Home in 1951. A charge of 1s. 4d., which was fixed in 1934, is made by the home for each dog. The home charges in addition a maintenance fee to the owners of dogs which are claimed and retains sums obtained from the sale of unclaimed dogs. The Commissioner of Police is satisfied that dogs sent to the home are properly cared for and that any dogs found to be diseased are segregated from the others.

Mr. Freeman: Does the right hon. and learned Gentleman consider that the amount of 1s. 4d., which I assumed is 2d. a day, is satisfactory for the maintenance of a dog and medical services for it during that period?

Sir D. Maxwell Fyfe: The home has not asked for an increase in that fee of 1s. 4d., but the expenses which may be charged to owners were increased this year with Home Office approval.

Mr. Mellish: Does the Home Secretary agree that in view of the fact that people pay dog licences the vast bulk of the money so received should be sent to homes such as this? What happens to the remainder of that money? Why is it not used for the benefit of dogs' homes? Dogs should be painlessly destroyed and so save expense and suffering?

Sir D. Maxwell Fyfe: That again is another question.

Pigs (Numbers)

Mr. Nabarro (December 11th) asked the Minister of Agriculture to state the pig population of the United Kingdom, backyard and otherwise, at the latest convenient date, compared with one year and two years earlier; and what steps he is taking to secure further increases in the pig population of the United Kingdom in 1953.

Sir T. Dugdale: The estimate for September, 1952, is 5,790,000 pigs compared with 5,070,000 in 1951 and 3,790,000 in 1950. Further increases will largely depend on greater supplies of home-grown feeding-stuffs, increased production of which is being encouraged by such means as grants towards the ploughing-up of grassland and the application of fertilisers.

Pigs (Antibiotics for Fattening)

Mr. Nabarro (December 11th) asked the Minister of Agriculture what progress has been made by his department in investigating the use of antibiotics for fattening pigs; what influence this recourse is having on pig rearing; and what estimate he has made of the anticipated increase in supplies of bacon, ham and associated products that may be expected from increased use of antibiotics during the course of 1953.

Sir T. Dugdale: The Agricultural Research Council is conducting trials of certain antibiotics in the diet of fattening pigs. Though the trials are not yet complete, an announcement by the Council indicates a strong probability that the results will be favourable. The use of antibiotics by farmers for feeding pigs would require amendment of the Penicillin Act, 1947. As for the last part of the Question, I could not attempt at this stage to make any estimate of the results likely in 1953.

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ROYAL COLLEGE OF VETERINARY SURGEONS

DECEMBER, 1952, EXAMINATIONS

List of Successful Candidates

London

Second Examination

Physiology only

Beaumont, S. H.
Bedson, I. F.
Bowles, Jeffrey
Brazier, J. F. H.
Coryn, H. D.
Davidson, H. M.
Davies, M. G.
Derbyshire, J. B. (credit)
Dier, B. G. F.
Down, B. C.
Evans, E. D.
Fairhill, D. C.
Finn, C. A.
Gee, R. E.
Gray, John
Heptinstall, Jack
Hudson, J. R.
Hyde, Miss K. B.
Jones, R. H.
Kerry, J. B.
Lifton, J. M.
Markham, Keith
Miller, J. A.
Morath, D. E.
Naylor, D. C.
Owen, Geoffrey
Parkinson, K. D.
Peters, J. B.
Pocock, E. W.
Rawson-Shaw, Miss E. A.
Shrimpton, D. F.
Strang, R. D.
Taylor, E. L. G.
Thorp, A. C. B.
Townsend, Miles
Wall, L. J. T.
Ward, Anthony
Watson, Miss D. P.
White, Frederick
Williamson, D. C.
Wilson, Miss E. D.
Woollett, W. G. W. A.
Wright, M. A.

Anatomy (including Histology)

Archer, F. R.
Blaxland, D. R.
Carter, P. A.
McCracken, R. W.
Rutherford, L. H.
Sutton, J. B.
Marrable, A. W. (credit)

THIRD EXAMINATION

Hygiene only

Abraham, B. F.
Alexander, T. J. L.
Ansell, R. H.
Arnold, J. H. S.
Baldwin, I. J.
Barton, C. K. O.
Beddows, A. C. L.
Beesley, C. J. (credit)
Benbow, G. M.
Booker, J. C.
Breese, J. L.
Brocklesby, D. W.
Buxton, Peter
Bywater, J. E. C.
Cansfield, C. J.
Cawthorne, W. N.
Epps, H. B. G.
Gibson, F. E. T. (credit)
Hammond, Miss W. M.
Hampshire, F. J. W.
Holmes, J. R.
Holmes, R. G.
James, P. H.
Jones, T. H.
Kearns, M. P.
King, D. K.
Loving, Charles
McVoy, K. I.
Maynard, H. M. F.
Mears, R. H.
Nestel, B. M. (credit)
Olorenshaw, P. H.
Roberts, D. H.
Russell, G. H.
Simons, M. A. P.
Smith, Miss L. C.
Stalbow, Michael
Tiffin, R. B.
Vinycomb, Miss H. M. (credit)
Wells, J. R.

THIRD EXAMINATION

Pathology only

Basiner, Donald
Cochrane-Dyet, I. G. C.
Cox, J. A.
Cunningham, J. A.
Douch, J. A.
Eden, R. M. G.
Gillett, T. G. F.
Godfrey, M. J.
Hawkins, Albert
Hayes, T. J.
Hullis, Roy
Hunter, F. E.
Jones, J. E.
Mackay, B. H. P.
Michael, J. R.
Morgan, D. B.
Samuel, R. M.
Shaw, D. L.
Stockwell, G. D.
Swann, A. I.
Taffs, L. F.
Tuckey, J. B.
Watson, K. R.
Williams, J. R. L.

FINAL EXAMINATION

Barnsley, D. G. C.
Carnaghan, R. B. A.
Catterall, P. W.
Choudhury, M. U. A.
Christie, E. J.
Clarke-Williams, P. R.
Evans, A. D. G.
Ford, G. K.
Herbert, W. J.
Hoddinott, R. P. F.
Keymer, I. F.
Langford, S. H.
Malseed, J. R. (M)
Monks, R. W. M.
Redmond, M. R.
Rees, R. B.
Thuraisingham, Sinnatamby
Tiedeman, B. G.
Wilkinson, J. S.
Howe, W. T.
Rossdale, P. D.
McMillan, D. D.

(M) denotes credit in Medicine.

Edinburgh

FIRST EXAMINATION

Cameron, D. C. K.
Dodson, G. R.
Ironside, J. B. R.
McDougall, G. M.
Moore, T. E.
Robertson, H. L.
Stretch, I. L.
Wilson, G. A.

SECOND EXAMINATION

Gyi, K. K.
Johnson, D. E.
Jones, J. S. L.
*Kay, H. R. M.
Kirkbride, L. M.
McIntosh, S. A.
Mackenzie, R. M.
Steele, R. B. T.
Stewart, J. G.
Teale, P. C.

THIRD EXAMINATION

Baird, R. G.
Black, Michael
Campbell, H. M.
Cock, E. V.
Fraser, Donald
Gaunt, J. L.
Guilor, Miss Mary
Peden, A. B.
Rodger, D. S.
Shannon, David
Trainer, P. E.
Vizard, D. J.
Watson, A. R. A.

FOURTH EXAMINATION

Blizzard, S. V. A.
Campbell, R. J.
Crocker, R. W.
Gilchrist, Miss H. G. R.
Griffiths, B. C. R.
McLaren, A. P. B.
Thoma, J. W.
Thomson, K. S.
Watson, H. B.

* Denotes Second-class Honours

FINAL EXAMINATION

Beck, C. J.
Bennett, D. G.
Bonn, J. M.
Bowler, R. K.
Chew, S. K.
Goodchild, W. M.
Goss, C. J.
Macqueen, A. C. W.
Mitchell, A. W. (M)
Plummer, G. A.
Sanderson, J. F.
Stokes, P. M.
Storrar, J. E.
Temiyachol, P.

(M) denotes credit in Medicine.

Liverpool

THIRD EXAMINATION

Hygiene only
Shaib, Bukar

Pathology only
Illingworth, H. M.

FINAL EXAMINATION

Davies, G. P.
Davies, J. E.
Jones, R. A.
Kaluski, S. J.
Lewis, E. O.
Unsworth, W. P.

(To be continued)

NOTES AND NEWS

Diary of Events

Jan. 1st.—Meeting of the Central Veterinary Society at the Royal Veterinary College, N.W.1., 6 p.m.

Jan. 2nd.—Meeting of the Association of Veterinary Teachers and Research Workers, at the Royal Veterinary College, N.W.1, 11 a.m.

Jan. 7th.—Meetings of the Editorial Committee, B.V.A., at 36, Gordon Square: Executive 2 p.m.; main 3 p.m. (*N.B. Brought forward from the second to the first Wednesday in the month.*)

Jan. 7th.—Meeting of the R.A.V.C. Division, B.V.A., in the Lecture Theatre of the Zoological Society's Gardens, Regent's Park, London, 12 noon.

Jan. 9th, 1953.—Dumfries and Galloway Division, B.V.A., Ladies' Guild: Annual Dance in aid of the V.V.B.F., at Dumfries (Cairndale Hotel). (See Notice.)

Feb. 27th.—Annual Ball of the Veterinary Society, Faculty of Veterinary Science, The University, Liverpool, to be held in the Students' Union from 8.0 p.m. to 2.0 a.m.

Council and Committee Meetings of the B.V.A.

The following arrangements for the Council and Committee meetings of the B.V.A. in January, April and July of 1953, have been made by Council B.V.A.:—

January 14th, 15th and 16th in London.
April 29th, 30th and May 1st in Edinburgh.
July 29th, 30th and 31st in London.

The times of the various meetings will be published in due course.

The next quarterly meetings will be held in London on January 14th, 15th and 16th, 1953, in the following order:—

Wednesday, January 14th.—10 a.m., Home Appointments Committee; 11.30, Parliamentary and Public Relations Committee; 2 p.m., Organising Committee; 4 p.m. Provisional Committee.

Thursday, January 15th.—10 a.m., Veterinary State Medicine Committee; 12 noon, Finance Sub-committee; 2.30 p.m., General Purposes and Finance Committee.

Friday, January 16th, at the Connaught Rooms:

9.30 a.m.—Special Meeting of Council to deal with: (1) New premises for the Association; (2) Report of the Departmental Committee on Licences under Section 7 of the Veterinary Surgeon's Act, 1948.

11 a.m.—Ordinary Meeting of Council.

R.C.V.S. Council and Committee Meetings

The next series of meetings will be held in London on February 4th, 5th and 6th (Council).

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PERSONAL

Appointments.—The following appointments in the Colonial Veterinary Service are announced:—Mr. R. F. Coughlan, B.V.SC., D.V.M., as Veterinary Research Officer, Federation of Malaya; Mr. C. J. Price, M.R.C.V.S., as Veterinary Officer, Uganda, and Mr. J. G. Tremlett, M.R.C.V.S., as Veterinary Officer, Northern Rhodesia.

Births.—BIRKETT.—On November 21st, 1952, at Alston Cottage Hospital, Cumberland, to Winifred Mary, wife of John D. Birkett, M.R.C.V.S., Director of Veterinary Services, Sierra Leone, a daughter—Judith Guerin.

FELGATE.—On December 8th, 1952, at Eastholme Nursing Home, Lincoln, to Annette, wife of C. A. G. Felgate, M.R.C.V.S., a daughter—Wendy Margaret.

WOOD.—On December 9th, 1952, to Irene, wife of Colin Wood, M.R.C.V.S., Hillview, Nether Dargavel, Dumfries, a son (Rognvald Sinclair).

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Forthcoming Marriage.—MUNRO—KEEN.—The engagement is announced between Ian Bell Munro, M.R.C.V.S., second son of Mr. and Mrs. D. M. Munro, of Edinburgh, and June Barbara Keen, B.SC., daughter of Mr. and Mrs. L. W. Keen, of Chingford, London.

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Marriages.—BUNTAIN—CAMPBELL.—On November 18th, 1952, at Lenzie, Glasgow, by the Rev. J. S. Phillips, David Buntain, M.R.C.V.S., of Reading, Berks, to Mary, only daughter of Mr. and Mrs. Archd. Campbell, of Fintry, Stirlingshire.

IRVINE—GEDDES.—On November 26th, 1952, at Milford Presbyterian Church, Milford, Mich, U.S.A. James D. Irvine, B.A., LL.B., of Milford and Detroit, to Margaret B. Geddes, M.R.C.V.S., of Dunoon, Argyll.

WARREN—CRAWFORD.—On October 25th, 1952, at All Saints Church, Bromsgrove, Worcs, Anthony L. Warren, M.R.C.V.S., to Dorothy M. Crawford.

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Ministry's Veterinary Field Staff: Changes in Personnel.—The following changes are announced:—

Mr. A. M. K. McLeod, M.R.C.V.S., D.V.S.M., Divisional Veterinary Officer at the Ministry's Scottish Office, has been promoted to Acting Superintending Veterinary Officer.

Mr. R. C. Matheson, M.R.C.V.S., Veterinary Officer at Head Office, Tolworth, has been promoted to Acting Divisional Veterinary Officer.

Mr. D. K. Jones, B.SC., M.R.C.V.S., at present Veterinary Officer at Wells, has been transferred to Brecon.

Mr. R. Wilson, M.R.C.V.S., at present Veterinary Officer at Carmarthen, has been transferred to Hamilton.

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Colonel Middleton Perry's Retirement from Wembley.—Colonel E. Middleton Perry, veterinary surgeon at Wembley since the first greyhound meeting, retires on December 8th. He has attended every race meeting and trial at the stadium in the past 25 years.

His successor is Mr. E. C. Bovett, who was veterinary surgeon to the Eastville and Knowle stadiums, Bristol, and whose family have been associated with veterinary surgery for the past 150 years.

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Mrs. Jack Motton wishes to return thanks to all who by their overwhelming kindness and sympathy have given her help when she needed it most. Rosevean, Penzance.

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R.C.V.S. OBITUARY

SAUNDERS, Rowland Glave, C.B.E., M.R.C.V.S., 2 Alexandra Terrace, Exmouth. Graduated London, May 14th, 1895. Died December 10th, 1952; aged 79 years.

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Mr. R. Glave Saunders, C.B.E., M.R.C.V.S.

War-time Mayor of Exeter

It is a sad coincidence that within a short time of recording the death of and tributes to Mr. S. J. Motton, of Penzance, we should be called upon to announce, again with the deepest regret, the passing of a former partner in his practice who became a prominent and well-loved figure in the public life of the City of Exeter—Mr. Rowland Glave Saunders, C.B.E., who passed away at his Exmouth residence in his 80th year, after a considerable period of ill health.

Mr. Glave Saunders was a native of the city of which he became Sheriff and as Mayor during World War II he set up a modern record for the city with six successive terms. He was made an honorary freeman of the city, and for his public services received the C.B.E.

The elder son of Mr. Tom A. Saunders, founder of the drapery firm of Messrs. Saunders and Mumford, in Exeter, Mr. Glave Saunders had as maternal grandfather Mr. Henry Glave, founder of a famous drapery business in Oxford Street, London. On leaving school he became a pupil of the late Mr. James P. Heath, veterinary surgeon. Qualifying in 1895 at the Royal Veterinary College, London, where he won the first prize medal for the best essay of the year, he was for three years lecturer at the Colonial (Agricultural) College, Suffolk. Then Mr. Glave Saunders moved to Cornwall, and for 30 years practised as a veterinary surgeon at Penzance.

Mr. Glave Saunders was chairman and president of the Penzance Chamber of Commerce and a member of the Town Council's Entertainments Committee.

While at Penzance he married Miss Gladys Dorothy Martin, a great music lover and keenly interested in the theatre.

Mr. Glave Saunders helped to form the Penzance Players, in which he and his wife played leading roles. He was one of the founders of the Penzance Pavilion Theatre. As hon. secretary he helped the late Lady Mary Trefusis to organise the first country folk-dance festival ever to be held.

A RECORD IN EXETER MAYORALTY

Returning to Exeter on retirement in 1926, Mr. Glave Saunders was three years later elected to the City Council as a Liberal representative for Exwick Ward, and was chairman of a number of committees. In its account of his invaluable activities during the war years, the *Exeter Express & Echo* says: "Mr. Glave Saunders became Sheriff of the city in 1935-36. This proved a timely apprenticeship to what became the outstanding period in his public life. Accepting the position of Mayor of the city for the term 1938-39, his new office carried him into the period of the second World War.

"So ably had Mr. and Mrs. Glave Saunders carried out their Mayoral duties in this anxious first term that Mr. Glave Saunders was invited and consented to serve a second term, and this was repeated for a total succession of six terms, constituting a record in the Exeter Mayoralty in modern times. The late Sir James Owen held the office for five successive terms at the period of the first Great War.

"Mr. and Mrs. Glave Saunders were indefatigable in the discharge of their war-time duties from the first coming of the London refugees, during the continuing organisation of the city's great war effort, its reaction to frequent enemy bombing, the blitz of May, 1942, and the visit of King George VI and Queen Elizabeth a few days later, to the triumphant termination of the struggle.

"Amid other important duties the Mayor was chairman of the War Emergency Committee, president (with the Mayoress) of the city's Air Raid Relief Fund, and chairman of the Allied Services Club in Queen Street, which did such good work for the troops in and around Exeter. After the war Mr. Glave Saunders continued for a term as Deputy Mayor to assist his successor in the new tasks ahead. In recognition of his war-time and other public services Mr. Glave Saunders was made a C.B.E., and Exeter honoured him by making him an honorary freeman of the city.

"During his Mayoralty of 1940 Mr. Glave Saunders saw Greater Exeter come into being. Extension of the city boundary doubled its area, added over 2,000 to the population, and £30,000 to the rateable value. As Mayor and Mayoress, Mr. and Mrs. Glave Saunders, with other civic representatives beat the new boundary in Corporation buses during a journey of about 21 miles. Mr. Glave Saunders became the first chairman of the Replanning Committee which grappled with the gigantic task of post-war rehabilitation. He retired from the Council in November 1945. By virtue of his Mayoralty Mr. Glave Saunders sat as a city magistrate for six years."

Mr. Glave Saunders kept a rough journal of the war years which he eventually proposed to deposit with the Roborough Library of the University College of the South-west. Soon after the last war he produced an interesting booklet: "Things I Have Said, 1938-45," copies of which were graciously accepted by King George VI and other members of the Royal Family.

R.S.P.C.A. AND OTHER WORK

As is well said by the local paper quoted above, one of the kindliest and most approachable of men, Mr. Glave Saunders touched life at many points and was ever ready to forward any cultural interest. His fellow members of the profession will recall his helpful membership of the Western Counties Division of this Association, of which Division he became President. He was a staunch supporter of the R.S.P.C.A., occupying for 20 years the post of hon. secretary of the Exeter, East and West Devon branch, while latterly he represented Devon, Cornwall and Dorset on the Council of the R.S.P.C.A. in London. At Exmouth he became Chairman of the Animals' Dispensary and of the locally-formed branch of Federal Union. He also took great interest in the

Youth Hostel movement, partly himself as a tourist on foot, and was formerly president of the University College Club at Exeter. He subsequently served on the Council of the College. On his return to Exeter Mr. Glave Saunders became identified with the Theatre Royal, and was for a long time Chairman of the Directors of Exeter Theatre Company Ltd. He had also been President of Exeter Amateur Operatic Society.

"Mr. Glave Saunders took an interest in scientific subjects, and on occasions engaged in controversy on these. He was a member of the Devonshire Association. His keen artistic sense was responsible for his expressed hope when the last war ended that Exeter would set about the beautification as well as the restoration of the city. Mr. Glave Saunders's hobbies were gardening, walking, and photography. Before the last war and occasionally after he travelled extensively on the Continent. When Mayor he criticised the calling of British beauty spots by Continental names and advocated hotel menus being printed in English, not French. He went on long walks in this country."

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HARRY STEELE-BODGER MEMORIAL FUND

First List of Donations

	£	s.	d.
Mr. L. G. Anderson, Mr. R. R. Bugg (Aylesbury) ...	3	3	0
Mr. R. F. Armour (Ludlow)	7	7	0
Captain J. R. Barker (Hereford)	10	10	0
Mr. E. P. Barrett (Guildford)	5	5	0
Dr. N. S. Barron (Reading)	1	1	0
Mr. J. K. Bateman (Potters Bar)	1	1	0
Mr. A. J. Baxter, Mr. H. Forsyth (Lechlade) ...	2	0	0
His Grace the Duke of Beaufort (Badminton) ...	1	1	0
Mr. F. Beckett (Blandford)	10	0	0
Mr. P. R. Blair-Fish (Steyning)	1	1	0
Dr. W. P. Blount (London)	1	1	0
Mr. W. G. Blythman (Newcastle)	5	5	0
Mr. L. W. Bovett (Bridgwater)	1	1	0
Mr. D. I. Bowen (Tenby)	1	1	0
Mrs. W. C. Brancker (Sutton Coldfield)	5	5	0
Miss Mary Brancker (Sutton Coldfield)	21	0	0
Dr. G. B. Brook (Leamington Spa)	1	1	0
Professor T. G. Browne (Dublin)	3	3	0
Mr. J. W. Bruford, Mr. D. G. Hanbury, Mr. A. M. Taylor (Sevenoaks)	7	7	0
Messrs. Burroughs Wellcome and Co.	105	0	0
Mr. G. N. Bushman (London)	5	5	0
Mr. H. E. Bywater (London)	5	5	0
Mr. H. Caldwell (Aylesbury)	1	1	0
Mr. A. R. Campbell (Inchinnan)		10	0
Dr. J. Carmichael (Ongar)	1	1	0
Mr. F. Chambers (Wolverhampton)	5	5	0
Mr. R. W. L. Chesney (Minehead)	2	2	0
Mr. T. A. R. Chipperfield (Crowborough)	5	5	0
Mrs. K. Cole-Powney (Carshalton)	1	1	0
Mr. D. H. Craddock (Loughton)	1	1	0
Mr. H. A. Crawshaw (Newbury)	1	1	0
Mr. P. Crosfield (Chipping Norton)	1	0	0
Mr. F. A. Crowhurst (Maidstone)	2	2	0
Mr. P. J. Dalton, Mr. K. A. Harris (Salisbury) ...	2	2	0
Mr. F. J. Daly (Dublin)		10	6
Mr. A. C. Dixon (Berkhamsted)	1	1	0
Major J. J. Dunlop (London)	1	1	0
Mr. C. Fennell (Basingstoke)	1	1	0
Mr. C. A. Foden, Mr. R. W. Hartley (Petersfield)	1	1	0
Mr. D. Forwell (Totnes)	1	1	0
Mr. A. C. Fraser (Marlborough)		10	6
Dr. W. S. Gordon (Compton)	2	2	0
Mr. G. N. Gould (Southampton)	21	0	0
Mr. J. Gourley (Nottingham)		10	6
Mr. A. M. Graham (Maidenhead)	5	5	0
Mr. D. L. Grant (Newmarket)	10	10	0
Dr. J. R. Greig (Edinburgh)	5	5	0
Sir Richard Haddon (London)	26	5	0
Mr. F. P. Halpin and Mr. J. Heath (London) ...	1	1	0
Mrs. M. L. Harris (Dunblane)	2	2	0
Mr. J. D. Hawkins (Chichester)	5	0	0
Mr. D. Haxton (Upton-on-Severn)	1	1	0
Mr. R. Hayes (Leeds)	1	0	0
Mr. H. F. Hebeler (Langport)	5	5	0
Mr. J. R. Hepburn, Mr. J. F. Watson (Milnathort)		10	6
Mr. H. R. Hewetson (Southport)	5	0	0
Messrs. C. J. Hewlett and Son Ltd.	5	5	0
Major T. Hicks (Sleaford)	2	2	0
Mr. P. G. Hignett (Frant)	1	1	0
Mr. and Mrs. S. L. Hignett and Family (Frant) ...	10	10	0
Mr. A. J. Hines (Grimsby)	2	2	0
Mr. J. Holroyd (Blackburn)	10	10	0
Mrs. D. Howell (Reading)	1	0	0
Mr. J. Ings (Lyndhurst) (Farmer)	2	2	0
Mr. and Mrs. O. F. Jackson (Darlington)	1	1	0
Miss Eva James (Sutton Coldfield)	8	8	0
Mr. A. Johnston (Shifnal)	1	1	0
Mr. W. Kendrick (Chester)	2	2	0
Mr. H. T. C. Laker (Horsham)	5	0	0
Professor H. G. Lamont (Belfast)	2	2	0
Mr. G. C. Lancaster (Evesham)	2	0	0
Lieut.-Colonel H. M. Llewellyn (Abergavenny) ...	2	2	0
Mr. W. L. Lloyd-Jones (Preston Park)	1	1	0
Dr. R. Lovell (Streatley)	5	5	0
Mr. D. I. MacAllister (Stranraer)	10	0	0
Mr. J. B. McKinna (Huddersfield)	1	1	0
Mr. J. McLintock, Mr. T. F. Tunney, Mr. J. Phillips (Norwich)	3	3	0
Mr. J. A. McMenamin (Dublin)	1	0	0
Messrs. Bob Martin Ltd.	10	10	0
Mr. C. Masson, Mr. J. A. Dall (Torquay)	2	2	0
Mr. A. Mather (Torrington)	1	1	0
Mr. J. A. Matheson, Mr. J. Donald (Atherstone) ...	10	10	0
Mr. H. T. Matthews (Cambridge)	5	5	0
Mr. A. Melville (Midhurst)	10	10	0
Midland Counties Veterinary Association	100	0	0
Mr. Wm. C. Miller (Newmarket)	2	2	0
Mr. P. J. Mitchell (Chelmsford)	2	2	0
Mr. T. M. Mitchell (Stocksfield)	5	5	0
Professor W. M. Mitchell (Edinburgh)	10	10	0
Dr. R. F. Montgomerie (Otford)	5	5	0
Mr. K. Morgan (Houghton)	5	5	0
Mr. J. T. Morton (Stratford-on-Avon)	1	1	0
Mr. W. Nairn (Blairgowrie)	10	10	0
Mr. E. Nightingale (Darwen) (Veterinary Practitioner)		10	6
Mr. J. G. O'Sullivan (Glasgow)	1	0	0
Mr. T. Parker (Fareham) (Farmer)	1	1	0
Mr. C. F. Parsons (Dublin)	1	1	0
Mr. J. D. Paterson (Ashford)	1	1	0
Mr. A. E. Payne (Walton-on-Thames)	2	2	0
Mr. E. A. Pearce (Northwich)	1	1	0
Mr. G. S. Peyton, Mr. B. H. Cobbett (Canterbury) ...	3	3	0
Mr. J. Pickup (Barnet)	2	2	0
Mr. G. F. Planton (Bristol) (Veterinary Practitioner)	1	1	0
Mr. J. W. Procter, Mr. G. N. Sutherland, Mr. H. B. Steele, Mr. E. V. Fawell, Mr. D. Sillars, Mr. D. E. Watson (York)	21	0	0
Professor L. P. Pugh (Cambridge)	5	5	0
Mr. T. W. Robson (Penrith)		10	6
Mr. G. W. Sangster (Lochmaben)	1	1	0
Mr. J. Scarnell (Pembury)	1	1	0
Mr. H. S. Scott (Chingford) (Veterinary Practitioner)	2	2	0
Mr. K. C. Sellers (Leeds)	1	1	0
Mr. P. L. Shanks (Bucksburn)	5	0	0
Miss A. M. Smith (Newcastle-on-Tyne)	1	1	0
Mr. C. N. Smith (Beccles) (Veterinary Practitioner)		10	0
Mrs. R. Findlay Smith (Finchley)	1	1	0
Miss R. M. Smith (Finchley)	2	2	0
Southern Counties Veterinary Society	10	10	0
Major A. Spreull (Dundee)	1	1	0
Dr. A. W. Stableforth (Weybridge)	5	5	0
Mr. L. P. Stafford (Blandford)	1	0	0
Mrs. K. Steele-Bodger (Tamworth)	26	5	0
Mr. and Mrs. Alasdiar Steele-Bodger (Lichfield) ...	36	15	0
Mr. M. Steele-Bodger (Tamworth)	26	5	0
Mr. W. A. S. Stevens (Southsea)	1	1	0
Mr. H. J. Steven (Westerham)	1	1	0
Mr. J. S. Steward (Nottingham)	1	0	0
Mr. Alec Thomson (Glasgow)	5	5	0
Mr. S. H. Thompson (Stockport)	1	0	0
Mr. E. P. Thorne (Lewes)	1	0	0
Mr. G. W. Tingley (Chailey) (Veterinary Practitioner)	1	1	0
Mr. Tripp (Sutton Coldfield)	1	1	0
Mr. P. J. Turner, Mr. J. A. Turner (Southbourne)	1	1	0
Mr. P. R. Turner, Mr. G. Nixon (Bury St. Edmunds)	1	1	0
Mr. J. F. D. Tutt (Winchester)	10	10	0
Miss O. Uvarov (Ewell)	1	1	0
Mr. D. N. Walker (Aberdeen)		6	4
Mr. C. Watson (Haverfordwest)	5	5	0
Mr. E. T. Watts (Cowbridge)	1	1	0

Mr. D. H. Williams (Neath)	2	2	0
Colonel and Mrs. V. D. S. Williams (Farnham Royal)	2	2	0
Mr. H. M. Wilson (Cupar, Fife)	1	1	0
Mr. R. I. Wood (Ripon)	1	1	0
Miss C. A. Woods and Miss M. Dalby (Menston-in-Wharfedale)	5	5	0
Dr. W. R. Wooldridge (London)	5	5	0
Mr. A. J. Wright (Macclesfield)	5	5	0
Anonymous donations amount to	1	10	0
Total	£815	1	4

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LEGAL NOTES

Breach of Warranty in Sale of Navicular Horse

In its issue of December 6th the *Birkenhead Advertiser* reported that on the previous Thursday Mrs. Florence Reid, a widow, of 12, Allport Lane, Bromborough, brought a successful action for £45 10s. damages at Birkenhead County Court against the owner of the Arrowe Park Riding School from whom she bought a horse later found to be suffering from navicular disease. She was represented by Mr. A. Rankin, who said that she wanted a horse for her 15-year-old daughter to ride and jump. Her agent, Mr. E. B. McKenna, of Thurstaston Riding School, attended a sale at Wrexham and saw a horse which was not in the catalogue. He made an offer to its owner, Mr. Philip Wise, of Arrowe Park Road, Upton, which was refused as Mr. Wise wished to put the horse up for auction. Mr. Wise told him that it was a sound horse and a good jumper. At the auction he bought the horse for £46 5s.

In evidence Mr. McKenna said that he took the horse back to his school and at first the horse seemed keen and very good. On the Sunday following the sale, however, the horse seemed most reluctant to take the jumps and the following day he decided it was lame and had it examined by a veterinary surgeon.

The veterinary surgeon, Mr. Noel Ormerod, said that the horse was suffering from navicular disease, which was progressive and incurable. It must have had the disease prior to the sale.

Mr. Wise told the judge that he bought the horse a fortnight before he sold it. In that fortnight it was ridden every day by his own daughters. It was ridden on the night before the sale and was in good condition, jumping very well.

Mr. F. J. Nance, appearing for Mr. Wise, submitted that a guarantee about the horse's fitness was not a condition of sale, and that there was no satisfactory evidence that the horse was suffering from the disease at the time of the sale.

Judge Emlyn Jones said he was satisfied with the veterinary surgeon's evidence that the horse was suffering from the disease at the time of the sale. He was very sorry for Mr. Wise as it was most unfortunate for him. There could be no doubt that the horse was warranted to Mrs. Reid's agent and that warranty was broken.

* * * * *

Goldfish Not an "Article"

Holding that a goldfish was not an article within the meaning of the Public Health Act, Mr. J. P. Eddy, Q.C., the West Ham Stipendiary Magistrate, recently dismissed a summons brought by West Ham Corporation against James Markham, rag dealer, of Hollins Avenue, Stratford, E., for delivering a goldfish in exchange for rags to a child under the age of 14. The case had been adjourned for the magistrate to consider whether or not a goldfish was an "article."

Mr. J. E. Cassidy, for the corporation, quoted several cases where living things had been held to be articles within the meaning of the Act. There were several cases of day-old chicks being regarded as articles, and in 1860 a horse was held to be an article. There had been convictions in exactly similar circumstances. He had some idea that at the Battle of Waterloo the Duke of Wellington said of the British soldier: "This is the article which will finish the fight."

Mr. Eddy pointed out that section 154 of the Public Health Act, 1936, provided that no person collecting old clothes or similar articles should deliver any article whatever to a person under the age of 14. In this case the authority had failed to satisfy him that the word "article" included goldfish. On the contrary, he saw no reason why it should not be construed in its popular sense. "Nobody in ordinary conversation would refer to the goldfish as an article. I think that the word 'article' in this enactment means an inanimate object. It follows, in my opinion, that a goldfish escapes this statutory qualification."

FOWL PEST INFECTION WIDESPREAD

As has been indicated in our columns notifying the addresses of disease-infected premises, fowl pest infection has spread widely since the outbreak in Yorkshire a month ago: further outbreaks are announced daily and the number of birds destroyed during the period approximates 67,000.

The symptoms of the present mild form of disease are dullness and ruffled feathers in a number of birds; refusal of food, and usually a sudden fall in egg production; slight watery discharge from the eyes and nostrils, with sneezing and head shaking; difficult respiration, with accompanying throat "gurgle"; loose, greenish-coloured droppings or staining and "pasting" of vent feathers. Mild cases escape detection in small domestic flocks and among farmyard hens as well as in regular commercial flocks. Turkeys, geese, ducks, and other birds may carry the infection.

In this epidemic the Ministry has not closed the markets for live poultry, no doubt because this would interfere with the Christmas trade. More drastic measures may soon have to be imposed to stop the movement of poultry. Meanwhile, it ought to be more widely known that is an offence to send away live poultry from premises on to which any live poultry have been moved during the preceding 28 days. This applies to day-old chicks as well as to adult birds. The Ministry asks all poultry keepers to observe this regulation strictly.

After the week-end the Ministry announced that of the 62 county divisions in England and Wales recognised for the purposes of agricultural administration, 38 were affected. On Wednesday last there had been 179 outbreaks since November 28th.

* * * * *

Southern Counties Veterinary Society.—Mr. G. H. Bennett, Hon. Secretary, writes: "Due to a regretted oversight, it was stated in the minutes of the Southern Counties Veterinary Society's annual general meeting, held on June 4, 1952, that the retiring President, Mr. E. G. Morris, automatically became Senior Vice-President. This should have stated that the retiring President was Mr. B. D. Bassett who automatically became Senior Vice-President."

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Argyll.—Machrigbeg, Southend, Campbeltown (Dec. 9th).
Beds.—215, Common Road, Kensworth (Dec. 9th).
Berks.—The Piggeries, Barrow Lane, Abingdon (Dec. 9th).
Ches.—Northwood Hall, High Legh, Knutsford (Dec. 5th); Pedley House Farm, Great Warford, Knutsford (Dec. 9th); Kidnall Hall Farm, Malpas (Dec. 11th).
Cornwall.—Farm Pennance, Merrits Hill, Illogan, Redruth (Dec. 6th); 48, Penwarwyn Road, Par (Dec. 11th).
Derbys.—Bromley House Farm, Barlborough, Chesterfield (Dec. 5th); Abbotsford Farm, Heanor Road, Ilkeston (Dec. 8th).
Devons.—Middle Down, Sutcombe, Holsworthy (Dec. 6th); Churston Mill Farm, Brixham (Dec. 10th); Kerswell Barton, Broadclyst, Exeter (Dec. 11th).
Essex.—13, Crow Lane, Romford (Dec. 9th).
Glos.—93, High Street, Marshfield, Chippenham (Dec. 5th).
Hants.—Walton Heath Cottage, Southwick, Fareham (Dec. 10th).
Herts.—Green Lanes, Markgate, St. Albans (Dec. 6th).
Kent.—Park Farm, Knockholt, Sevenoaks (Dec. 8th).
Lancs.—Lea Farm, Plodder Lane, Farnworth (Dec. 6th); Spout House Farm, Alston, Longridge; Smithfield Farm, Downham, Clitheroe (Dec. 9th).
Leics.—Hill Top, Sproxton, Melton Mowbray (Dec. 9th).
Norfolk.—Green Farm, Ashill, Thetford (Dec. 11th).
Notts.—Grange Farm, Alfreton Road, Sutton-in-Ashfield (Dec. 11th).
Renfrews.—Doughihill Farm, Port Glasgow (Dec. 6th).
Salop.—Harper Adams Agricultural College, Newport (Dec. 10th).
Somerset.—Middle Twinhoe Farm, Midford, Bath; Greenswood Coal Wharf, Clutton, Bristol; Yew Tree Farm, Stock Lane, Langford, Bristol (Dec. 9th).
Staffs.—Brook House Farm, Cheddleton, Leek (Dec. 8th).
Suffolk.—Newall Hall, Huntingfield, Halesworth (Dec. 6th); Moat Farm, Getingham, Woodbridge (Dec. 8th).
Sussex.—New Lodge Farm, Coleman's Hatch, Tunbridge Wells (Dec. 8th); Barn House Farm, Shipley, Horsham; Rowner Farm, Billingshurst (Dec. 9th).
Warwicks.—Manor Farm, Compton Scorpion Manor, Shipston-on-Stour (Dec. 8th).
Westmorland.—Row Farm, Lyth, Kendal (Dec. 9th); Brown House, Newby, Penrith (Dec 10th).

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Wilts.—Manor Farm, Little Bedwyn, Marlborough (Dec. 5th); Kellaways Road, Langley Burrell, Chippenham (Dec. 10th).
Yorks.—Copley House Farm, East Bierley, Bradford (Dec. 10th).

FOWL PEST:

Beds.—Bell View, Bidwell, Dunstable (Dec. 11th).
Brecons.—Dell Cottage, Cross Load, Middlecommon, Gilwern, Abergavenny; 13, Park View, Brynmawr (Dec. 7th).
Bucks.—The Spinney, Risborough Road, Stoke Mandeville, Aylesbury (Dec. 5th).
Caernarvons.—Pen-Bwlch, Llannelhaiarn (Dec. 6th).
Cards.—Clyngwyn Farm, Cribyn, Lampeter (Dec. 9th).
Carmarthens.—Gwynfryn, Tyisha Road, Tumble, Llanelly (Dec. 7th).
Ches.—Big Hind Heath Farm, Sandbach (Dec. 10th).
Derbys.—4, Furnace Row, Lower Somercotes, Derby (Dec. 7th); 62 and 115, Bentink Road, Shuttlewood, Chesterfield (Dec. 11th).
Devons.—Rose Cottage, Bucks Mills, Bideford (Dec. 6th); Park View, Parkside Road, Pinhoe, Exeter (Dec. 9th).
Essex.—93, Southchurch Avenue, Southend-on-Sea (Dec. 5th); Grasmere Avenue, Hull Bridge, Hockley (Dec. 7th); 87, Rectory Road, Grays (Dec. 10th).
Glams.—Llan Farm, Llansambt, Swansea (Dec. 8th).
Glos.—Corston Farm, Littleton-on-Severn, Thornbury (Dec. 11th).
Herefords.—The Villa, Newton, Newchurch, Kington (Dec. 5th); Woodlands Cottage, Newton St. Margarets, Hereford; Gwerngenny, Wormbridge; Ilan Farm, Dorstone, Hereford (Dec. 6th).
Herts.—4, College Road, St. Albans (Dec. 11th).
Isle of Ely.—March Road, Wimblington, March (Dec. 10th); Railway Siding, Norwood Road, March (Dec. 11th).
Kent.—Forge Farm, Powdermill Lane, Southborough (Dec. 7th); 50, Roseacre Road, Welling (Dec. 8th); Durham House Farm, Green Street Green, Dartford (Dec. 11th).
Lancs.—Carr House Farm, Cabus, Garstang, Preston; Top O'th Bank Field Holding, Haslingdon, Rossendale (Dec. 9th); Bewshill Farm, Over Hulton, Bolton (Dec. 10th); Springside, East Bank, Water, Rossendale; Allen's Piggery, Radcliffe, Manchester (Dec. 11th).
Leics.—Foxton Polish Hostel, Foxton, Lubbenham, Market Harborough (Dec. 6th); Drayton House, Drayton, Market Harborough (Dec. 10th).
Lincs.—Green Farm, Swinhope, Binbrook, Lincoln (Dec. 6th); The Gardens, Church Street, Louth (Dec. 7th); Bleak Farm, Harmston, Lincoln; Blackthorn Lane, Boston (Dec. 8th); 78, Crossing, Gosberton Bank, Spalding; 95, North Street, Crowland, Peterborough (Dec. 9th); Loosegate Moulton, Spalding; Home Leigh, Helpringham, Sleaford (Dec. 11th).
Monmouths.—Rectory Farm, Bryagwyn, Raglan (Dec. 5th); 8, Coronation Road, Six Bells, Abertillery (Dec. 9th).
Norfolk.—"Jesyvon," Town Street, Upwell, Wisbech (Dec. 5th); Lonsdale Villa and Avondale, Upwell, Wisbech; E. Wadby, Upwell, Wisbech; Ivy Farm, Nattishall, Dereham (Dec. 7th); 16, Council House, Three Holes, Wisbech (Dec. 9th); Town Street, Upwell, Wisbech (Dec. 10th); Manor Farm, Carbrook, Thetford (Dec. 11th).
Northants.—The Bungalow, Chowns Mill, Irthlingborough, Wellingborough (Dec. 5th).
Northumberland.—Station House, Lambley, Carlisle (Dec. 5th); 50, Bere Crescent, Holycross, Wallsend (Dec. 10th).
Notts.—Church Hill, Kirton, Ollerton, Newark (Dec. 10th).
Pembrokes.—Trearched, Grocsgoch, Haverfordwest (Dec. 6th).
Staffs.—19, Beasley Avenue, Chesterton, Stoke-on-Trent; School House, Springwood, Chesterton, Stoke-on-Trent (Dec. 8th).
Suffolk.—Police Station, Nacton, Ipswich (Dec. 6th).
Sussex.—Coate House, Arundel Road, Worthing (Dec. 8th); Stanhope Farm, Clapham, Arundel (Dec. 10th).
Warwicks.—Hen Meadow, Beanfall Lane, Hatton (Dec. 6th).
Westmorland.—Bracay Hotel, Ambleside (Dec. 10th).
Worcs.—24, Alvechurch Highway, Lydiate Ash, Bromsgrove (Dec. 7th); Woodrow Farm, Lydiate Ash, Bromsgrove; 17, Yew Tree Avenue, Belbroughton, Stourbridge (Dec. 8th).
Yorks.—Moorfield, Mytholmroyd (Dec. 5th); West End Allotments, Rossington, Doncaster (Dec. 6th); 9, New House, Mytholmroyd; Moorside Farm, Midgeley, Luddenfoot Acy Lane, Preston, Hill (Dec. 7th); Lee Farm, Lumbutts, Todmorden (Dec. 8th); High Greenwood Farm, Heptonstall, Hebden Bridge; Saville Farm, Northowram, Halifax (Dec. 9th); 61, High Street, Mosborough, Sheffield (Dec. 9th); 186, Stubley Lane, Dronfield, Woodhouse, Sheffield; Fenham Lane, Lingerfield, Knaresborough (Dec. 10th); Jack Hay Farm and Wood Hall Lane, Sowerby Bridge, Halifax; Moorside Farm, Low Moor, Bradford; 318, Denbydale Road, Dukar, Wakefield (Dec. 11th).

SWINE FEVER:

Beds.—Wood End Farm, Pertenhall, Bedford (Dec. 5th).
Bucks.—Frogmore Farm, Saunderton, Princes Risborough (Dec. 6th); Keepers Cottage, Rassler Wood, Gt. Marlow (Dec. 8th); Middle Farm, Shipton Lees, Quainton, Aylesbury (Dec. 10th); Manor Farm, Princes Risborough (Dec. 11th).
Cornwall.—West Cornwall Hospital Management Committee, Tehidy Sanatorium, Camborne (Dec. 8th).
Essex.—Great Hickle Farm, Dedham, Colchester (Dec. 8th); B.X. Plastics Pig Club, Brantham Works, Manningtree (Dec. 9th); 14, Accommodation Road, Boxted, and Hassocks Farm, East Bergholt, Colchester (Dec. 12th).
Hertford.—Hampton Hall Farm, Moor Lane, Rickmansworth (Dec. 12th).
Lincs.—Allotment Field, Long Sutton, Holbeach; Caister Road Farm, Laceby, Grimsby (Dec. 11th); The Hollies, South Cockerington, Louth, Lincs (Dec. 13th).
Rutland.—Prebendal House, Empingham, Oakham (Dec. 8th); Woodland Lane Farm, Braunston, Oakham, Rutland (Dec. 13th).
Suffolk.—Sheepcote Farm, Great Henny, Sudbury (Dec. 12th).
Yorks.—Harrisons Yard, Bramley, Leeds; Gate Eel Farm, Dacre Banks, Summerbridge, Harrogate (Dec. 13th).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

THE TREATMENT OF PREGNANCY TOXAEMIA IN THE EWE

Sir,—I have been very interested in the correspondence relating to the treatment of the above condition in the ewe by the administration of glycerine as a drench, as for some time past in my practice we have been treating cases of bovine acetonaemia by giving a pint of glycerine in an equal amount of water as a drench, reducing milking to once a day, and when available, feeding potatoes, either raw or cooked—but in either case pulped—at the rate of 8 to 10 lb. per cow per day for a period of a week.

A.C.T.H. (Crooke's) has been recommended for the treatment of this condition in the bovine, and American literature has suggested a dose of 1 gramme per day per cow. If, however, this is given by intravenous drip (which, personally, I consider is not practical) it could be conveniently and effectively cut down to 50 mg. A correspondent has informed me that he understands that this method is being used successfully in Singapore.

Some of my clients who are sheep-breeders on a somewhat large scale have told me that when they dosed their in-lamb ewes with solutions of copper sulphate as a prophylactic against "strongylosis," they never had cases of "sway-back" in the lambs. Since using more "modern methods," they do.

I should like to hear if other colleagues have had similar information.—Yours faithfully, J. F. D. TUTT, "Rothiemurchus," Winchester. *December 12th*, 1952.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange	Sheep Scab	Swine Fever
16th to 30th November, 1952	90	—	24	—	—	24
Corresponding period in—						
1951	13	37	69	—	2	61
1950	12	—	9	—	1	53
1949	11	2	17	—	—	—
1st Jan. to 30th November, 1952	1,051	495	230	—	1	788
Corresponding period in—						
1951	367	70	784	—	8	1,257
1950	318	20	120	—	24	330
1949	217	15	558	—	34	5

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at November 30th, 1952, was as follows:—

England	Wales	Scotland	Total (Great Britain)
46,049	25,886	22,639	94,574